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ART. XXV.—DRIMYS CHILENSIS. *De Candolle.* The Winter's Bark of Chili.

By Joseph Carson, M. D.

The genus *Drimys* belongs to the natural family of Magnoliaceae, sub-order *Winteraceæ;* and to Polyandria, Polygynia of the Sexual System. The name *Drimys* was given to the genus by Foster, and has been adopted by De Candolle after Lamarck.

Generic Character. Carpels congested, baccate, many-seeded; filaments thickest at the apex; cells of the anthers separate.—*De Candolle.*

The *essential characters* consist in a *calyx* splitting unequally, the numerous *petals*, club-shaped *stamens*, with terminal two-lobed anthers, no style, berries superior and aggregate, and seeds several in a double row.

Specific Characters. *Leaves* oblong, obovate, glaucous beneath; *peduncles* crowded, one-flowered or arising from a common peduncle; *petals* six to nine, oblong subobtuse. *Berries* oval, sub-compressed, obtuse. *De Candolle*, Prodrom, vol 1, p. 78.

Dr. Lindley, in his Medical Flora, has confounded this plant with two other species—the D. *winteri* and D. *granatensis;* the former found in the neighborhood of the straits

of Magellan, and the latter in the northern parts of South America.

This *shrub* appears to be common in the marshes of Chili, whence Mr. Dombey procured specimens. It was separated and made into a new species by De Candolle from the specimens examined by him in the Museum of Paris.

Similar specimens were sent to this country by Dr. Styles of Valparaiso, in 1836, some of which were deposited by me in the Herbarium of the Acadamy of Natural Sciences of Philadelphia. The leaves correspond to the description given by De Candolle; they are three or four inches long, and one wide. The flowers are axillary or terminal, from three to five together, in umbellated panicles which are an inch and a half or two inches long. The calyx in three distinct ovate sepals; the corolla somewhat stellate in form and constituted of at least twelve oblong ovate unequally sized petals. The germs are five in number, around which the shorter stamina are inserted on the receptacle.

The difference between this and the D. *winteri* consists in the character of the leaves, the calyx, and the number and form of the petals. The flowers, instead of being simple, are clustered.

The bark of this plant has the same aromatic and tonic virtues as the Winter's Bark, and is used for similar purposes.

Merat and De Lens state that the specimen of D. *winteri* which is in their possession came from Chili, and was sent by Dr. Bertero. Was it not the present plant? As no description was given, this question, can only be answered conjecturally. D. *magnoliæfolia*, the bark of which is called Canelo in Chili, is the same species.

The plate represents the Drimys Chilensis in flower. The fruit and inflorescence are those of the D. *granatensis*.

ART. XXVI.—ON FLUID EXTRACT OF VALERIAN.

By Evan T. Ellis.

(*An Inaugural Essay.*)

There is sufficient reason to believe, that valerian as a remedial agent has been much undervalued, at least in this country, and that it has consequently fallen into unmerited neglect. The causes which have contributed to produce this, may be traced in part to that ever fluctuating popularity from which some of our best remedies are not exempt; to the peculiar influence which soil and climate have upon this plant; and especially to the want of a preparation of it of uniform strength, possessing in a concentrated form the entire virtues of the root, and not liable to undergo any change. Little doubt exists that it possesses inherent properties, which might prove of decided advantage in neuralgic affections, when other remedies are either inadmissible or have failed to give relief.

The discovery of an organic acid in this root, has, like the alkaloids of Cinchona, directed attention to the subject, and opened a new field of research, as shown by several valuable communications already before us.

Valerianic acid presents to us an interesting aspect, existing as it does in combination with an essential oil, and separated by the oxidation of the latter. Recent experiments have shown us, that this oxidation can be accelerated by means of other substances, and results in the formation of a much larger proportion of acid, than if simply produced by the action of air alone; hence it is more readily and economically obtained, and thereby its use will be greatly extended. We have seen this acid advantageously combined with oxide of zinc, of iron, and with quinia, exhibiting in the class of salts called valerianates, the excellent properties of two valuable therapeutical agents—the one an acid, the

other a base. It seems highly probable that it is to this acid, that the peculiar medical properties of valerian are chiefly due.

A preparation holding in solution valerianic acid must therefore possess the activity of the root, especially if the combination present the other valuable properties of the plant, divested of all that is inert and useless. A convenient form for administering a remedy, smallness of dose, and a facility of preparation by every skilful pharmaceutist, are not unimportant recommendations for a preparation of this kind; and such we believe will be found combined in the fluid extract of valerian.

Care is necessary on the introduction of a new preparation, that it may not be inferior to those already in use; for although novelty may induce a trial, its future employment must depend upon its efficacy.

Of the preparations of valerian now in use, we find all more or less objectionable. The tincture, on account of the small amount of root to the proportion of spirit. The volatile tincture of the Edinburgh College owes its properties almost wholly to the aromatic ammonia. The infusions in hot water are objectionable from their perishable nature, and containing, as they must, matters of no medicinal power. The solid extract must, from the nature of the article, be an inert preparation. The syrup prepared from the cold infusion has been advantageously used, but its value as a remedy, chiefly depends upon the care exercised in its preparation; it is mild and often inadmissible. The distilled water noticed, is without doubt the best of existing preparations, excepting the one we are about to notice, but is liable to variation of strength by age.

The class of remedies of comparatively recent date, termed fluid extracts, possessing, as they most undoubtedly do, in many cases, numerous advantages over other preparations of the same article, have obtained a degree of popularity commensurate with their superior excellence, and their introduction may justly be regarded as a new "era in pharmacy."

They mostly contain, as it is well known, a variable amount of sugar; but the term may, I conceive, be with more propriety applied to those, where, as in the case of the solid extracts, this ingredient is wanting.

Of the fluid extracts now in use, the most common, as those of sarsaparilla and senna, will not materially suffer by the action of heat in concentration, but in the present instance we have a volatile principle to extract, therefore the mode of procedure must be adapted to the peculiar subject under consideration. The first point is, what is worthy of extraction in the root. Secondly, the adoption of a standard of strength so important to prescriber and apothecary. From the best analysis of this root, viz: that by Trommsdorf, we have the volatile oil containing the acid, resin, bitter extractive, and other matters of no importance in a medicinal preparation. The oil and acid are very readily and effectually taken up by ether—resin by alcohol—and bitter extractive by water—hence the three menstrua are employed.

The form of apparatus best adapted, is the common displacement funnel, having the top secured by bladder, and a receiver fitted so as to prevent as much as possible the escape of the ether whilst acting on the root.

The standard of strength I have adopted, is eight troy ounces of the root to the fluid pint of the extract; it was my original intention to have given a recipe, in which the strength of an ounce of the root would be represented by a fluid ounce of the extract; but owing to the destructive influence of heat on evaporation, without which the fluid seemed incapable of retaining so large an amount of substance in solution, I was induced to abandon it, and think the above strong enough for all cases. The medium dose is a teaspoonful, containing, in solution, the active principle of thirty grains of the root.

In making this, as all other preparations of valerian, the selection of a prime article of root is a point of great impor-

tance, and of all that reaches our market the fresh English is decidedly to be preferred. The whole operation should be conducted with all those precautions so necessary in the proper management of displacement.

The proportions I have adopted are as follows:

Rad. Valerian. offic.	℥viij.	Troy.
Spt. Vin. Rect.	f.℥viij.	
Ether. Sulph.	f.℥iv.	
Aquæ	q.s.	

Having finely bruised the root, place it in the instrument. As the alcohol and ether do not interfere in their action, mix and obtain by careful percolation as strong a tincture as can be made, which may be determined by the liquid ceasing to acquire additional colour or taste; remove the last portions by water, and set the solution aside in an open dish in a warm room to evaporate, which it is allowed to do until all the ether and half of the alcohol are gone. The remainder then amounts to f.℥iv., is of a greenish colour, oily, containing all the acid, consequently having, in a high degree, the well known taste and odour of the root.

We then proceed with water, and if the first portion is mixed with any of the preceding menstruum, it should be submitted to gentle heat in order to expel it. The first f.℥viij. of cold infusion free from spirit are set aside, because if any of the volatile principles which may be left in the root are soluble in cold water, they will be taken up, and the concentration may be practised on the remainder without danger to the extractive. The root is finally exhausted with cold water, which is to be determined mainly by the taste; the colouring principle, continuing, as in the case of Krameria, after all the bitterness is extracted. Evaporate this by a water bath or steam-heat to f.℥iv., and finally mix all these solutions, and if a slight turbidness be observable, which has always been with me very trifling, it may be readily clarified by passing a few times through some of the exhausted dregs left in the displacement filter.

The product then is sixteen fluid ounces from the eight ounces of root, is of a dark brownish colour, limpid, having in a high degree the characteristics of the plant, of which it may be considered as an exact representative in an eligible form; the proportion of spirit is of course one-fourth. It has a specific gravity of about 1.215, is acid to litmus, and causes copious precipitates with nitrate of silver and sub-acetate of lead.

Having a simple extract, we may combine with aromatic or narcotic tinctures, so as to suit particular cases or views of the medical practitioner in its therapeutic employment.

With regard to its medical properties, I shall not of course be expected to say much. It may with safety and confidence be exhibited in all those cases which would indicate an anti-spasmodic or nervous sedative ; cases of wakefulness; nervous irritability—individuals accustomed to the use of opium and its preparations; also in neuralgic diseases attended with dyspepsia. I have received flattering accounts of its success in some of the above cases, a notice of which is out of place here.

The dose as before stated, is about a teaspoonful; it would probably be best to commence with a small dose, and increase until its effects on the system are fully developed. It may be readily swallowed in a little sweetened water.

Before closing this article, it is proper to remark, that an article prepared by Smith & Perry, of Boston, who we believe were the first to introduce it, is before the medical public. It is entirely different from the article prepared by the formula submitted above. The composition we are entirely ignorant of, but judging from the sensible properties should infer it was a compound extract.

ART. XXVII.—ON UVA, URSI OR BEARBERRY.

By J. Curtis C. Hughes.

(*An Inaugaral Essay.*)

The Uva Ursi is a low evergreen shrub, with long trailing stems. The leaves are short, oval, oblong, cuneate, smooth, shining, of a dark green colour on the upper surface. On the under surface they are of a lighter colour, and traced with veins of net work. When fresh, they are void of smell, but when dry and bruised they have the odour of hay. The flowers are of a reddish white colour. The fruit is a round berry. It is green at first, but when ripe it becomes red. The leaves are used for tanning, and would form a good substitute for sumac. This shrub inhabits northern Europe, Asia and America. It flourishes in a cold and barren soil. Our market is supplied from New Jersey.

Medical Properties.

Uva Ursi is an astringent tonic and diuretic. As an astringent it is applicable to all the purposes for which the vegetable astringents are used. The principal use of this medicine is in chronic affections of the bladder and kidneys. It has been used with success in strangury, with discharge of mucus; and also in gravel, by a direct action on the kidneys, and by giving tone to the digestive organs, in diabetes, gleet, fluor albus, menorrhagia, and pulmonary consumption. The dose of the powder ℈i. to ʒj. Of the decoction f.ʒi. to f.ʒiij. made by boiling 1 oz. of Uva Ursi with a pint and a half of distilled water to a pint. Of the extract grs. v. to grs. xv.

Chemical History.

1st. Two oz. of Uva Ursi in powder were treated by displacement with six fluid ounces of alcohol. The result-

ing tincture was of a dark green colour, and when evaporated to the consistence of a syrup, globules of a fixed oil floated on its surface, and on the sides of the dish a brownish matter was deposited, consisting of tannin, extractive and resin. After removing the fixed oil, the extract was treated with water, which dissolved the tannin, and extractive, leaving an undissolved portion, consisting mainly of resin and chlorophylle; soluble in alcohol and ether, and insoluble in acids. The watery solution of the extract was largely precipitated by tincture of muriate of iron.

2d. Uva Ursi when treated with ether by displacement, affords a deep green tincture, which leaves a greenish extract by evaporation, composed of tannin, chlorophylle, resin, and fixed oil. The extract, treated with water, is deprived of tannin, and the filter absorbs the oil, leaving the resin coloured with chlorophylle on the filter.

3d. Two ounces of Uva Ursi were macerated with acidulated water for twelve hours. The liquor was then strained and the residue boiled for twenty minutes three successive times in a pint of water. It was then displaced with water until it passed off nearly colourless and tasteless, and afterwards with alcohol until it ceased to remove any portion. It was then dried and weighed one oz., showing about fifty per cent. of lignin. This was without taste or odour, very brittle, readily decomposed with sulphuric acid, forming a thick black mass.

4th. Six oz. of Uva Ursi having been bruised and macerated in water for six hours, were then transferred to a retort placed in a sand bath; a solution of common salt was added, and a receiver adapted. The distillation continued for five hours. There was about a pint condensed in the receiver during the operation. The liquid in the retort was of a dark brown colour, but that which passed over was colourless; a light coloured oil collected in globules on the surface of the distilled liquid, having a very pleasant odour.

5th. An infusion was made of two oz. Uva Ursi with a pint of water. The infusion was precipitated with a solution of gelatin, forming tannate of gelatin, and the infusion was filtered. To a portion of the filtered liquid a solution of subacetate of lead was added; it produced a dull white precipitate. With lime water, a yellow, showing the existence of gum. To a second portion of the liquor a few drops of protochloride of tin were added, producing a white precipitate; with nitrate of silver a brown one denoting the presence of bitter extractive. To a third portion a few drops of tincture of muriate of iron were added; it turned black, proving the existence of gallic acid. Starch could not be detected with tincture of iodine.

Ashes of Uva Ursi were tested and found to contain potash and lime.

6th. One pound of Uva Ursi was macerated in water for twelve hours and displaced until two quarts of liquor were obtained. The tannin was precipitated with a solution of gelatin, and filtered. The liquor was evaporated to dryness, the extract remaining dissolved in strong alcohol, and treated with purified animal charcoal for twenty-four hours. It was then filtered, evaporated, redissolved in absolute alcohol, and treated with purified animal charcoal for twenty-four hours; filtered and crystallized by spontaneous evaporation. The crystals were pressed, redissolved in absolute alcohol, treated with animal charcoal, filtered and crystalized by spontaneous evaporation. This substance crystallizes in transparent, colourless needle-shaped prisms, soluble in alcohol, ether and dilute acid. It will not dissolve in essential and fixed oils. Its aqueous solution is precipitated by subacetate of lead and carb. potash; lime water, and tincture muriate of iron do not affect it. It is neutral to test paper, and combustible. One grain acted as a powerful diuretic.

From the experiments here detailed, it may be inferred that Uva Ursi contains tannin, gallic acid, gum, resin, bitter

extractive, volatile and fixed oils, lignin, and a peculiar principle, which, as it embodies the diuretic power of the leaves, may be called *Ursin*. This principle is worthy of a further investigation, particularly as to its chemical relations and medicinal powers. If it should prove to possess, in full, the useful properties of the plant, it may become a valuable agent in the hands of the practitioner.

ART. XXVIII.—REMARKS ON THE OINTMENT OF PRECIPITATED CARBONATE OF ZINC, AS A SUBSTITUTE FOR THE CERATUM ZINCI CARBONATIS, U. S. P.

By Thos. S. Wiegand.

About a year since, having need to replenish my stock of prepared Carbonate of Zinc, an article was supplied, with which, on account of its colour, I was dissatisfied. Previous to this time, a paper (published in the American Journal of Pharmacy for 1844, page 182,) which stated that a coloured sulphate of baryta was extensively substituted for calamine, had attracted my attention: supposing the subject worth examining, I concluded to test the quality by chemical reagents; the result of this examination was that there was no zinc present.

Despairing of success in obtaining a pure calamine, I determined to prepare the carbonate artificially, which may be readily affected in the following manner:

Take of crystallized sulphate of zinc, 1 lb.
" carbonate of soda, "

The salts are to be dissolved in separate portions of water, and the solutions mixed; when the precipitate shall have subsided, the supernatant liquor is to be drawn off, and the

precipitate washed till the washings no longer give a precipitate with a solution of chloride of barium; when operating on three pounds of sulphate of zinc, this usually requires three days.

To secure an elegant preparation—it is necessary that the sulphate of zinc should be free from iron; if not pure, it should be rendered so by boiling with a carbonate as recommended in the Amer. Jour. of Pharmacy, for 1846, page 242. When dry, it can be very easily reduced to a powder, which resembles in appearance calcined magnesia.

It was reasonable to suppose that a cerate made with a precipitated carbonate of zinc would be more efficacious than one made from a dense powder, as the minute division of the former would favour its activity, if its efficacy depend, as I suppose none will deny, upon the extent of surface exposed to the action of the fatty materials.

The cerate is prepared according to the formula of the United States Pharmacopœia, substituting the precipitated carbonate of zinc for the calamine. It has a white colour very slightly tinged with blue, and remains the same in appearance for several months.

It has been employed in all cases where the usual calamine cerate would have been used, and, in the opinion of the surgeon of the institution, with fully equal, if not greater advantage.

U. S. Naval Hospital, N. Y. Station, April 13th, 1847.

ART. XXIX.—PHARMACEUTICAL NOTICES.

By William Procter, Jr.

Donovan's Solution.

The formula for Donovans's solution, as published by its author, and of which a copy is found in the United States Dispensatory, presents so complex an appearance in the way of fractions of a grain, that many apothecaries, not possessed of a delicate balance and weights are deterred from making it.

Another objection is that a loss of iodine is occasioned by the exposure rendered necessary during the trituration of the three elements with the alcohol during the time that elapses before the combination is effected. The mercury rapidly acquires its dose of iodine, whilst the arsenic, which combines less readily, is liable to all the deficiency occasioned by vaporization. That this occurs is evident from a small quantity of arsenic left undissolved by the distilled water. The proportions in Donovan's formula are 6.08 grains of arsenic, 14.82 grains of mercury, and 49 grains of iodine, which are not exactly in atomic relation. In order that the preparation should be composed of one equivalent of each iodide, the numbers should be 5.5 arsenic, 14.82 mercury, 46.09 iodine, so that there is one-tenth of an equivalent of the arsenical iodide in excess. It is hardly probable that any sensible variation would be observable in the medicinal action of the solution if the iodides were used in equivalent proportion; and as their combining number is the same, the preparation of the solution may be much simplified.

The aggregate of the solid contents of half a pint of Donovan's solution is 70 grains, which is composed of 33⅓ grains of biniodide of mercury and 36⅔ grains of sesqui-iodide of arsenic. If the formula was made to require 35 grains

of each iodide, and half a pint of water, it would be greatly simplified, and could be made extemporaneously. The addition of hydriodic acid to the solution is unnecessary in this case, and its design in the formula of Donovan is doubtless to supply any deficiency due to loss of iodine in the operation.

The following formula, closely resembling that of Donovan in the proportions, avoids the fractions of a grain :

Take of Sesqui-iodide of arsenic, 36 grs :
" Biniodide of mercury, 34 "
" Distilled water, half a pint.

Triturate the two iodides with half an ounce of the water until they combine and dissolve, and then add the rest of the water, and filter.

The sesqui-iodide of arsenic is easily prepared. One part of metallic arsenic is reduced to an impalpable powder, intimately mixed with five parts of iodine by trituration, then introduced into a small flask or thin vial, and the mixture very gently heated until liquefaction occurs. The vessel should be nearly full, so as to prevent the formation of much iodine vapour, and enable the operator to bring the fused iodide in contact with all parts of it, and include any iodine that may have sublimed on the sides. If, on cooling, the contents of the vial assume a reddish yellow colour and crystallize on the sides of the vial, and no iodine odour is apparent, the operation is finished. The vessel is then fractured and the iodide removed.

If the arsenic and iodine are pure and the process skilfully conducted, nearly the whole of the arsenic is combined, and the compound is quite pure enough for making Donovan's solution without sublimation.

The metallic arsenic should be bright and lustrous, and the iodine crystallized and free from water. The ordinary cobalt or fly stone, which is metallic arsenic, is often pure enough for pharmaceutical use.

Atropia.

The activity of good extract of belladonna, leaves little to desire on the part of the practitioner in the internal exhibition of this drug, the dose being quite small, yet in its external application, with a view to the dilatation of the pupil of the eye or as an application in neuralgia, the extract is so disagreeable an application that several European surgeons have sought to avoid the staining effect on the skin by resorting to the active principle, atropia, in an isolated condition. In the February number of the *Journal de Pharmacie et de Chimie*, it is stated that "among the new remedies employed by M. Berard in the treatment of diseases of the eye, *atropia* should be placed in the first rank. This alkaloid, which can now be obtained from some pharmaceutists, possesses incontestable advantages in certain cases over belladonna itself.

"The greatest of these advantages is certainly the extreme rapidity with which it effects the dilatation of the pupil even in very minute quantity, as for instance by a solution containing one grain in one hundred grains of distilled water.

"Another advantage appreciated by the patient is the fact that the use of atropia avoids all the smearing and staining of the face, so characteristic of the ordinary mode of applying the extract; and which creates so great a repugnance to its use."

According to the Dublin Quarterly Journal (November, 1846, page 553,) "Dr. Wilde of that city employs the solution of atropia of these strengths:

No. 1. Atropia grs. j. distilled water f.℥j. diluted alcohol gtts. iij.
No. 2. Atropia grs. ij. distilled water f.℥j. diluted alcohol gtts. iij.
No. 3. Atropia grs. iij. distilled water f.℥j. diluted alcohol gtts. iij.

The alkaloid is rendered soluble by a drop of nitric acid, and the spirit is added to make the solution keep.

A single drop of No. 1 placed on the conjunctiva of the lower lid causes dilatation of the pupil in a healthy eye in from five to fifteen minutes."

The best process yet published for atropia is that of Mein, noticed in the United States Dispensatory, and in which the root is the subject of treatment with alcohol, lime, etc. As we cannot get belladonna root here, the only available source is the best extract, which, independent of the large amount of inert matter to get rid of, is too expensive to be employed with that view. Those who incline to make the experiment, however, may proceed by treating the extract with warm water until all the soluble portion is dissolved, filtering out the chlorophylle and albumen, evaporating the solution to a syrup, dissolving this in alcohol, and filtering if necessary, and then proceeding as in Mein's process with lime, acid, etc.

Belladonna leaves contain a large quantity of dark colouring matter, which renders the recent juice claret coloured, and is the chief cause of the staining. A solution of extract of belladonna precipitated with subacetate of lead, the excess of lead carefully with sulphuric acid, and the solution filtered from the sulphate of lead, carefully evaporated to four times the weight of the extract, no doubt would answer all the purposes of the solution of atropia.

Syrup of Orange Peel.

Those who are in the habit of preparing the syrup of orange peel according to the United States Pharmacopœia, know that it is strongly disposed to fermentation, and rapidly loses its agreeable qualities in warm weather. When made by the following formula it is more aromatic and preserves readily.

Two ounces of recently dried peel of the sweet orange is reduced to powder and lixiviated with a mixture of two parts of alcohol and one of water, until six fluid ounces are obtained. This tincture is then poured over and mixed well with 32 ounces (av.) of sugar in coarse powder, and spread on paper until the alcohol has evaporated. When this is accomplished, the aromatized sugar is made into

syrup with 16 fluid ounces of water, merely carrying the heat to ebullition in a covered vessel, straining and bottling hot. Prepared in this way, syrup of orange peel has a fine amber colour, and the orange taste in a marked degree.

ART. XXX.—ADHESIVE PLASTER EXEMPT FROM LEAD.

By M. Pettenkofer.

With the design of obviating the accidents that are occasioned under some circumstances by the absorption of soap of lead, and the irritant properties of the oleo-resins; in a word, to prevent the inconveniences arising from the employment of adhesive diachylon in medical practice, M. Pettenkofer proposes the therapeutical employment of the following preparation: mix eight parts of soap of lime, four of resin of turpentine, and one of suet; boil the mixture with a sufficiency of water until the whole enters into a homogeneous fusion, and then malaxate it in water as usual. If any undissolved particles of lime soap remain, it should be strained through linen. Lime soap does not melt in boiling water when alone, but with the resin its fusion is easy and complete.

As to the lime soap, it can readily be made either by saponifying olive oil with hydrate of lime, or, better, by adding a solution of a soluble salt of lime to an aqueous solution of olive oil soap. In the first case, an ounce and a quarter of recently burnt lime is slaked with six ounces of water, and reduced to a homogeneous consistence, then heat six ounces of olive oil in a tinned copper basin to some degrees above the boiling point of water, and add the milk of lime to the hot oil and maintain the mixture at the tem-

perature of boiling water, stirring constantly, until a small portion removed and cooled ceases to adhere to the fingers, and is friable. It is necessary to replace the water, as it evaporates during the boiling.

The soap of lime which furnishes the most beautiful plaster, is obtained by decomposing a solution of oil soap with one of chloride of calcium. The precipitate should be washed, expressed and dried; pulverized with half its weight of resin, (Térébenthine cuite,) and melt the mixture in boiling water with one-eighth of suet. This adhesive plaster resembles very closely in its consistence and exterior aspect that of lead employed at present, and it is very adhesive.—*Jour. de Pharm. from Repertorium für die Pharmacie.*

ART. XXXI.—ON THE EXTRACTION OF STRYCHNIA.

By M. J. F. Molyn.

The extraction of the vegetable alkaloids often presents considerable difficulty, because these active principles are found combined with acids, or mixed with other principles which accompany them in the different parts of the plant, and from which it is often very difficult to separate them. Nux vomica, which is used for the extraction of strychnia, in preference to St. Ignatius's beans, its commercial value being less, consists of a very hard horny substance, not easily penetrated by liquids; it contains a large quantity of gummy matter, which when the seeds are treated with water, dissolves together with the igasurate of strychnia. On adding lime to this solution, to decompose the salt of strychnia, the mucilage is precipitated with the alkaloid, forming a very

abundant deposit, which requires a large quantity of alcohol to deprive it of the strychnia which it contains. If to avoid this gummy matter, the seeds be directly treated with alcohol, the process becomes very expensive, in consequence of the large quantity of alcohol that must be employed to dissolve the whole of the strychnia.

The objections which apply to the above means, have induced me to try the effect of fermentation, which does not at all affect the active principle present. The gummy and saccharine matters of the seeds are decomposed, carbonic acid is disengaged, while the lactic acid which is produced, decomposing the igasurate of strychnia and brucia, forms with these alkaloids very soluble lactates.

Availing myself of those improvements which have been suggested by authors who have directed their attention to the extraction of strychnia, and adding such modifications as my experience proved to be useful, I have fixed on the following process, which, in addition to its being economical affords a good result.

Mix nine pounds of nux vomica in coarse powder with water, so as to form a thin paste. Keep this at a temperature of from 68° to 78° Fahr. for several days, when fermentation will manifest itself by the disengagement of a large quantity of carbonic acid. The mixture is to be daily stirred, so that the whole of the powder may be exposed to the fermentative process. I think that when the washed seeds are previously boiled for two or three hours, so as more completely to dissolve the gummy matter, the process is abridged. The fermentation is completed in eighteeen or twenty days, and is indicated by the cessation of the disengagement of gas. The mixture is then passed through a hair sieve and pressed. The residue is boiled two or three times, according to the quantity of water employed. The liquids are left to become clear by deposition, and are then evaporated to about three gallons. Add nine ounces of quick-lime in powder, well stirring the precipitate; let it

stand for six or eight hours, then separate the precipitate, and submit it to strong pressure. Heat the liquid to the boiling point, and add a slight excess of sulphuric acid; sulphate of lime is formed, which is allowed to subside, and the supernatant liquor is evaporated to about four pints; to this, one ounce of powdered quick lime is added, and the process above described, repeated. The precipitate resulting from this process, is pressed and added to the former; they are then dried and reduced to powder; this powder is digested in about ten pints of proof spirit, with a gentle heat. The spirit dissolves the brucia, the colouring matter, and a little of the strychnia, which may be recovered by evaporating the liquid, and allowing it to crystallize. The precipitate thus freed from brucia and colouring matter, and reduced to powder, is digested at twice, in ten pints of spirit of wine, sp. gr. 823. The solutions, which will be nearly colourless, are filtered, and four-fifths of the spirit recovered by distillation. On allowing the remaining solution to cool and stand for a day, the strychnia will be found at the bottom of the vessel, in the form of a white crystalline powder in a yellowish supernatant liquor. The liquor is to be decanted off, and the strychnia washed with proof spirit, which removes any remaining portion of brucia, and renders it chemically pure by one crystallization.—*Pharm. Journ. from Journal de Pharmacie d'Anvers.*

ART. XXXII.——ON THE SYRUP OF IODIDE OF IRON

By Messrs. T. and H. Smith, Edinburgh.

Most of the processes for syrup of iodide of iron which have hitherto come under our notice, appear to us unnecessarily tedious and complicated; although in the whole range of preparations included in the compass of the Pharmacopœias there is not, perhaps, a single one in which such a state of matters should be more carefully avoided. Consistently with correct adherence in the constitution of the resulting compound to the recognised formula, every effort should be made to render the operation simple, easy, and, above all, of speedy execution. The solution of iodide of iron before combination with the sugar in the form of syrup, is decomposed with such rapidity, that the eye can easily trace the changes of colour and appearance by which the decomposition is accompanied. The liquid from being quite transparent and almost colourless passes through deeper and deeper shades of green to brownish red, and in an amazingly short time is entirely decomposed and quite muddy from an abundant ferruginous precipitate. After a sufficient quantity of sugar has been dissolved in the solution to form a syrup, these changes are almost entirely arrested; so that even in an open vessel many days intervene before any striking alteration of colour can be remarked.

The process used by us for the syrup of iodide of iron is a modification of the formula of the Edinburgh Pharmacopœia, and, as we have by repeated trials long proved its value, it is here given for the use of the readers of the Pharmaceutical Journal.

Let a solution of iodide of iron be made in a flask with six hundred grains of iodine, two hundred grains of pure iron filings, and six ounces of *cold water*. The action being finished, after smart agitation for a few minutes, let the liquid, while yet hot from the intense chemical action,

be boiled over a gas flame, or in any other more convenient way, till its brown colour has disappeared, which is easily known by the froth becoming white. Let the liquid be now at once filtered through a small filter into a bottle, which has previously been marked by pasting on the outside of the bottle a small slip of paper at the level of eighteen fluid ounces, and containing thirteen ounces and a half of refined sugar, broken down into pieces about the size of peas. When the solution has all passed through, which fortunately takes place with unusual rapidity, let the filter be washed with boiling water, a further quantity of which must also be poured into the bottle till the liquid reaches the level of the mark. Let the bottle then be introduced into a hot-water bath and briskly shaken at short intervals, till the sugar is quite dissolved; and having adjusted the level of the syrup to the mark by the addition of water, after again shaking the bottle, let the syrup, without a moment's delay, be bottled into small phials, and secured as much as possible from contact with the air and light, by careful corking, and covering the bottles with some dark-coloured paper. These are the proportions adopted in the Edinburgh Pharmacopœia, and the syrup contains one grain of the iodide in twelve minims, or five grains in one drachm; but as the syrup first proposed by Dr. A. T. Thomson is weaker by two-fifths, containing three grains to the drachm, and which we believe is the strength of the syrup used in England, it is evident that the proportions must be varied accordingly. They will therefore stand thus :—

252 grains iodine
100 grains iron filings
2½ oz. cold water
10 oz. pure sugar.

Let the syrup, when finished, measure twelve ounces and a half, the level occupied by this quantity having been marked off on the bottle before-hand. It is advisable that

the bottle used in the preparation of the syrup should not have a capacity more than about a third above the quantity to be made.—*Pharm. Journ.*

ART. XXXIII.—ON MARKING INK, FOR MARKING LINEN, &c. WITHOUT THE USE OF A MORDANT.

By Mr. Redwood.

The practice of marking linen and other similar fabrics employed as wearing apparel, or for domestic use, with a preparation of silver, commonly called *Marking Ink*, has prevailed for many years, and has now become almost universal. The preparation first introduced for this purpose consisted of a solution of nitrate of silver, thickened with gum arabic and coloured with sap green; but in using this solution it is necessary previously to apply to the article to be marked, a *preparation* or *mordant*, consisting of a solution of carbonate of soda.

The following formula has been very generally adopted in the preparation of this kind of marking ink:

℞. Carbonate of Soda ℥ss.
Distilled Water ℥iv.
Mix, and sign "*The preparation or Mordant.*"

℞. Nitrate of Silver ℥j. ℈ij.
Gum Arabic ℥ij.
Sap green ℈j.
Distilled water f.℥j.
Mix, and sign "*The Ink.*"

The ink made from the above, or a similar formula, which,

I believe, almost every druggist through the country has been in the habit of preparing and selling, when used according to the usual instructions, produces a result which is subject to no objection that does not equally apply to any other marking ink having silver as its basis.

Within the last few years, however, the marking ink made as above, has been to a great extent superseded by the introduction of a new kind of ink, which does not require the use of a *mordant* or *preparation*. This ink appears to be generally preferred to the other;—it is in one bottle, which occupies but little space, and its use is considered to be attended with less trouble and inconvenience than that of the other.

My attention has recently been directed to this subject, as I was desirous of introducing a good formula for *marking ink to be used as a mordant* into the new edition, now publishing, of Gray's *Supplement to the Pharmacopœia.* Several formulæ have been published in the Journals, for the preparation of this ink, but none of these have given complete satisfaction.

The following appear to be the principal requisites in this kind of ink:

1st. That it shall flow freely from the pen, and form a well defined mark without running or blotting.

2d. That it shall not require a very strong or long continued heat to be applied, by holding the article that has been written on to the fire, or passing a hot iron over it, in order to develope the black mark required.

3d. That the mark produced by it, when developed by the application of heat, or by exposure to light, shall be perfectly black.

4th. That it shall not destroy the texture of even the finest cambric.

After several experiments, I have succeeded in making a

marking ink, which I think will be found to realize all the above conditions; it is thus prepared:—

℞. Nitrate of Silver ℥j.
Carbonate of Soda, crystallized, ℥iss.
Tartaric Acid ʒij. ℈ij.
Strong Liquor Ammoniæ f.ʒij. or *q. s.*
Archil f.℥ss.
White Sugar ʒiv.
Powdered Gum Arabic ʒxij.
Distilled Water *q. s.*

Dissolve the nitrate of silver and carbonate of soda separately in distilled water: mix the solutions: collect and wash the precipitate on a filter; introduce the washed precipitate, still moist, into a Wedgewood's-ware mortar, and add to it the tartaric acid, rubbing them together until effervescence has ceased; add *liquor ammoniæ* in sufficient quantity to dissolve the tartrate of silver; then mix in the archil, white sugar, and powdered gum arabic, and add as much distilled water, if required, as will make f.℥vj. of the mixture.

It will be observed that the essential difference between this formula and those which have been already published, consists in the use of tartrate of silver, instead of nitrate of silver.—*Pharm. Journ.*

ERRATA.—In our last number at page 105 in the formula for indelible ink, the quantity of "strong liquor of ammonia" is stated as "f.℥ij.," when it should read f.℥ij.; our subscribers will please make the correction.

ART. XXXIV.—ARTIFICIAL ULTRAMARINE: ITS COMPOSITION AND CHEMICAL PROPERTIES.

ULTRAMARINE, whether native or artificial, always consists of silica, alumina, sulphur, and a little oxide of iron; but no two specimens contain these substances in the same

proportions. Native ultramarine is procured from the lapis lazuli,—the artificial kind, according to Robiquet's process, is made by heating to low redness a mixture of one part of porcelain clay, one and a half of sulphur, and one and a half parts of anhydrous carbonate of soda, in a covered crucible so long as vapours are given off. When opened, the crucible is usually filled with a spongy mass of a deep blue colour, containing more or less ultramarine, mixed with the excess of sulphur employed, and some unaltered clay and soda. The results are, however, by no means uniform. The price of the native ultramarine was formerly five guineas an ounce, the artificial is sold at a few shillings an ounce, and is equally durable.

The colour of both is destroyed by nitric acid, or by a long-continued full red heat. Hence the difficulty in preparing the artificial variety. The destruction of the colour by nitric acid renders it easy to detect the admixture of cobalt, or Prussian blue, with ultramarine. The presence of indigo would be found by the use of sulphuric acid, which destroys the ultramarine and dissolves the indigo unchanged in colour. Strange as it may appear, even the artificial ultramarine is now largely adulterated. A specimen, lately examined by M. Chevalier, was found to contain forty per cent. of blue carbonate of copper. This is decidedly injurious, because the blue colour of copper, under exposure to air and light, slowly becomes green.

The discovery of artificial ultramarine was accidentally made by Vauquelin, in 1814. It was found on pulling down a soda factory, where sulphate of soda had been fused with charcoal, that some parts of the walls had a rich blue colour. This intelligent chemist examined the substance, and ascertained that it was identical in composition with ultramarine. Prizes were offered in France for a chemical process for its preparation; and the result was that methods were discovered about the same time by M. Guimet, Paris, and M. Gmelin, of Tubingen. The process of Robiquet above

given, is an improvement upon those first devised, and all that is now wanted is to discover the conditions for *constant* success. Here is a field for the "young chemistry" of England, if it can be induced to withdraw itself for a short time from the discovery of organic bases.

The essential constituent of ultramarine appears to be sulphuret of sodium; yet on what does the splendid colour depend?—the arrangement of matter! As in the case of the brilliant scarlet biniodide of mercury, which is formed of a white liquid metal and an iron grey crystalline solid, it is impossible to explain the cause of the colours by reference to the existence of any colouring principle. For a long time ultramarine was supposed, like the lapis lazuli, to owe its colour to the presence of iron. Clement and Desormes, however, prepared it without a trace of iron, and, what no one up to that time had suspected, they proved that it contained twenty-two per cent. of soda.

Ultramarine, whether native or artificial, is a most durable colour, and has great solidity; it undergoes no change from the lapse of time, probably from its being already in the state of sulphuret. It is equally blue by daylight and in the yellow light of a candle, while in artificial light cobalt is violet, and other blues appear more or less green, unless admixed with lake or crimson to counteract the effect of the yellow rays. Ultramarine does not appear to have been known to the ancients, although the Egyptians, unaided by chemical science, had discovered a most durable blue, now as bright on their mummy cases, as when first laid down three thousand years ago! Upon the composition of this and the other colours used by the ancients we shall probably make some remarks on a future occasion.—*Pharm. Journ. from Med. Gaz.*

ART. XXXV.—PREPARATION OF CARMINE.

THE following processes for the preparation of *carmine*, are taken from the 8th volume of *Dumas' Traité de Chimie, appliquée aux Arts*, which is just published.

Carmine, prepared with white of egg.—The carmines known under this name are made in the following manner:

℞. Cochineal, ℔j. ℥iv.
Carbonate of soda, gr. cxv.
Soft or river water, Cong. iv.

Boil these together for twenty minutes in a vessel, the depth of which is double its diameter, and which is furnished with two handles and a lip to facilitate the pouring out of the liquid. This boiler should also be furnished with an outer rim, which serves to support it over the furnace, so that the bottom alone is exposed to the fire. It should be heated with a wood fire, as the combustion of coal is found to be injurious to the quality of the carmine.

After boiling for twenty minutes, the boiler is to be removed from the fire, and ʒvj. of alum, and ʒj. of cream of tartar added. The mixture is to be stirred for a few minutes; the pan is then to be inclined so that the liquor may be easily decanted, and then left to itself. By degrees the refuse of the cochineal is deposited—the solution, which was of a violet colour, assumes a rose tint, then a bright red. The liquor is at this time slightly turbid, and evidently contains the carmine in suspension, but in such a fine state of division that it cannot be separated by filtration.

After standing at rest for about a quarter of an hour, the liquor is decanted, and passed through a very fine silk sieve. It is received into another pan, left at rest for a few minutes, and then decanted again, when a slight brownish deposit is left.

The white of two eggs, well beaten up, is then added,

and the liquor well stirred. Sometimes the carmine separates immediately in a flocculent form, and of a beautiful scarlet colour. Sometimes the separation does not immediately take place; in this case the pan must be placed on the fire, and left there until the flocculent carmine floats on the surface, which always occurs before the commencement of ebullition. The pan is then taken off the fire, and the floating carmine made to deposit by submerging it with a brush; it is then allowed to stand for ten minutes, and carefully decanted. The liquor becomes transparent, and the deposited carmine is afterwards separated, washed with three or four pints of water and collected on a strainer.

It is dried in a stove at a temperature from 82° to 86° Fahr. If dried in the open air it would become mouldy.

The carmine thus prepared, will be in the proportion of five or six drachms to the pound of cochineal used; but two or three drachms more, almost as good as the former, may be obtained, by boiling the decanted liquor, and treating it with white of egg as before.

This carmine is well suited for the use of confectioners, perfumers, artificial-flower-makers, and manufacturers of red ink; but it cannot be used by artists, as it is too granular, and does not work well under the brush.

Carmine, prepared with Isinglass.—The following is the process for preparing this kind of carmine:—

℞. Cochineal, in powder, ℔j.
Subcarbonate of potash, ʒiijss.
Alum, in powder, ʒviij.
Isinglass, ʒiijss.

Boil the cochineal and carbonate of potash, in a boiler containing five pails of water. After boiling for a few minutes, take the boiler off the fire and place it on a table, inclined to one side so as to facilitate decantation. Add the alum in powder, and stir the solution. The liquor changes colour and assumes a more brilliant tint. After a quarter of an hour, the cochineal will have deposited, and the liquor

have become as clear as if it had been filtered. It contains the carmine in suspension. The liquor is then decanted into a similar pan, and placed on the fire, adding the isinglass dissolved in a considerable quantity of water and strained. At the moment of ebullition the carmine rises to the surface, and a coagulum forms as in clarification with white of egg. The pan is then removed from the fire, and the liquor stirred with a spatula. After a quarter of an hour the carmine will be deposited, when the liquor is to be decanted and the deposit drained on a strained filter, and dried in the manner already described.—*Ibid.*

ART. XXXVI.—ON ARTIFICIAL AVENTURINE.

By Messrs. Fremy and Clemandot.

Although the manufacture of coloured glasses has been but recently introduced into France, it has recently been brought to such great perfection, that the gems produced by our manufacturers will, in many cases, bear comparison with those of Bohemia.

There is nevertheless a production of this class which had not as yet been manufactured in France; we allude to the artificial aventurine, which has hitherto only been made in Venice, and the manufacture of which is kept a profound secret. Fine specimens of Venitian aventurine are very scarce, and are sold at as high a price as 200 francs the kilogramme.

We were anxious to discover the mode of making this gem, and of giving the benefit of the discovery to our glass-workers.

After numerous experiments which have been conducted at the glasshouse of Clichy, we have been fortunate enough

to obtain results, which although not brought to the highest degree of perfection, are, notwithstanding, of a nature to induce a belief that in future aventurine will be manufactured in France.

As we wish to supply to our manufacturers, as soon as possible, the deficiency which has existed with reference to this product, we hasten to make known our process for the manufacture of aventurine, hoping that they may bring it to that perfection which practice alone can give it.

The chemical analyses, made principally by MM. Wöhler and Barreswil, have proved that Venetian aventurine is composed of a soft glass holding in suspension metallic and crystallized copper. It appeared, then, that aventurine should be obtained by crystallizing copper in melted glass, and having the mixture in such a state that the metallic crystals shall remain disseminated through the vitreous mass.

But knowing the tendency of copper to oxidation, and its fusibility, and appreciating all the circumstances opposed to its crystallization, and the equal diffusion of these crystals through the fused glass, it will be easy to understand the difficulties we had to surmount.

The choice of the composition which, by the action of heat, should afford metallic copper, was not less difficult. We found it necessary to reject those bodies which, in producing copper, would require a temperature either too high or too low; in the first case the metal would become agglomerated before the fusion of the glass; in the second, it would fuse, separate from the glass, and collect at the bottom of the crucible. Neither could we admit of those reactions, which, in producing metallic copper, would give rise to an abundant disengagement of gas, or the deposition of a coloured or insoluble deposit in the glass. A composition had to be found which, at the temperature of the fusion of glass, would produce metallic copper.

After trying without success the action of different metals on glass coloured by oxide of copper, we have been led to

examine the reduction which oxides at the minimum of oxidation are capable of effecting on protoxide of copper, and our attention was principally directed to the action in this way of iron scales.

We have found that, under the influence of heat, iron scales quickly reduce the protoxide of copper to the metallic state, passing itself to the state of peroxide of iron. This reaction appeared well suited to fulfil the end we proposed; it produces pure copper, and has the advantage of forming a metallic oxide, soluble in the glass, and giving it only a slight yellow tint. The formation of a silicate of peroxide of iron is a fortunate circumstance, for, by increasing the density of the glass, this silicate would naturally oppose the deposition of the metallic crystals. We, therefore, with confidence tried to produce Venitian aventurine by heating a mixture of glass, protoxide of copper, and iron scales. The experiment confirmed our anticipations.

On heating for twelve hours a mixture of 300 parts of powdered glass, 40 parts of protoxide of copper, and 80 parts of iron scales, and then allowing it to cool very slowly, we obtained a vitreous mass, containing, in abundance, crystals of metallic copper.

The most difficult point in the manufacture of aventurine, namely, the production of a glass containing brilliant crystals of copper, uniformly diffused through the mass, has, therefore, been completely resolved.

The specimens of aventurine which we now present to the Academy, have a certain degree of opacity which destroys the brilliancy of the metallic crystals, and these crystals also are not so large as they should be; but the experiments we are now making lead us to hope that we shall soon have specimens completely satisfactory.

To convince ourselves of the identity of our aventurine with that made at Venice, we have examined them with an excellent microscope, and we find that in both the copper is crystallized in regular octahedrons.—*Pharm. Journ. from Journal de Pharmacie.*

ART. XXXVII.—ON THE CONSTITUTION OF BEBEERINE.

By Douglas Maclagan, M. D., F. R. S. E., and Thomas G. Tilley, Esq. Professor of Chemistry in the Queen's College, Birmingham.

Bebeerine is the name given by Dr. Rodie, of Demerara, to an organic base, of which he pointed out the existence in the bark of a tree of that colony, known by the name of *Bebeeru* or *Green Heart.* This tree has recently been examined botanically by Sir Robert Schomburgk, and found to be a species of *Nectandra*, which, in compliment to Dr. Rodie, he has named *N. Rodiei* (*Hooker's London Journal of Botany*, December, 1844.)

The general properties of the alkali, and the preparation of its sulphate for medicinal use were further described by one of us in a paper read before the Royal Society of Edinburgh, in April 1843, (*Transactions*, vol. xv. part iii.) In this memoir an account was given of the preparation of bebeerine, in what was regarded as a state of chemical purity, and of its separation by means of æther from what was believed to be another alkaline matter, sipeerine; but as the substance is neither crystallizable nor colourless, it could not decidedly be affirmed to be chemically pure until its constitution had been determined by ultimate analysis. This desideratum it is proposed to supply in the present paper.

The chief difficulty in preparing the pure alkali arose from the troublesome process required to free it from adhering tannin, considerable loss being experienced in the methods then adopted. This has subsequently been accomplished with greater facility by the following process, which may be applicable to the purification of other organic bases.

The sulphate prepared for medicinal use, which is always more or less impure, is precipitated by ammonia; and the alkaline matter thus separated, is, after washing with water, triturated with about an equal weight of freshly precipitated

and moist hydrated oxide of lead. The magma thus formed is then dried over the water-bath, and the alkali is taken up by absolute alcohol. On distilling off the spirit, the organic base is left in the form of a transparent orange-yellow resinous mass, as described in the paper above quoted. This, on being dried, pulverized, and treated with successive portions of pure æther, is in great part dissolved in this fluid. The dissolved portion, on distilling off the ether, is obtained in the form of a translucent, amorphous, but homogeneous resinous-looking substance, of a pale yellow colour, and possessed of all the properties of an organic alkali. This is pure bebeerine, as described in April, 1843.

Bebeerine thus obtained does not crystallize. It is very soluble in alcohol, less so in ether, and very sparingly in water. Heated, it fuses; and the heat being continued, it swells up, giving off vapours of a strong peculiar odour, and burns without residue. Subjected to the action of oxidizing agents, it gives with bichromate of potash and sulphuric acid, a black, and with nitric acid a yellow resin. It forms with acids salts which are all uncrystallizable; with perchloride of gold, mercury, copper, iron and platinum, it gives precipitates which are soluble to a certain extent in hot water and alcohol, but which on the solution cooling, are not deposited from it in a crystalline form.

When precipitated by ammonia from its solution in acids, it is obtained in the form of a very pale yellow powder. This was examined with a view to determine whether or not it was a hydrate of the alkali. It was washed, dried *in vacuo* over sulphuric acid, and heated in an oil-bath. At 108° Fahr. it began to soften, and at 370° it fused into a transparent brown resinous mass. It did not sensibly lose weight during the process, and had undergone no change in properties from exposure to this temperature, as it retained its perfect solubility in acids, and formed with them the usual bright yellow solution.

The results of several ultimate analyses of two different specimens of bebeerine give the following as its composition, $C^{35}\ H^{40}\ N^{2}\ O^{6}$.

It appears to have been sufficiently established by the experience of medical practitioners, that bebeerine possesses marked properties as a remedy for periodic diseases, (Maclagan, *Edinburgh Medical and Surgical Journal*, April, 1845.)

On comparing its composition with that of other vegetable alkalies possessed of similar remedial powers, such as quinine and cinchonine, it is not a little remarkable that it differs from them in atomic constitution, and that it is isomeric with morphia, which acts as a pure narcotic. The atomic constitution of morphia, calculated from the formulæ deduced by Liebig and Regnault from their analyses, agrees perfectly with that given above for bebeerine. The composition of the two bases is, in fact, identical.

This is the first instance of isomerism occurring in substances belonging to the class of organic bases.

One very interesting conclusion regarding the action of medicinal substances appears to be deducible from these results, that similarity of physiological properties does not depend upon similarity in the proportions of their constituents. It seems probable that the mode in which their atoms are grouped has an important share in modifying their physiological actions; for in the present instance we have the same number of atoms both in morphia and bebeerine, but in the one producing a white crystalline body of narcotic qualities, in the other a yellow amorphous resinous-looking substance, acting as an anti-periodic. The difference in their physical properties in fact proves that their elements are differently arranged.

We have not been enabled to examine *sipeerine*, the substance left behind when pure bebeerine is dissolved out by means of æther. It occurs in a very minute quantity, and requires a very tedious repetition of the treatment with

ether to free it from the last traces of bebeerine. There seems, from some trials which we have made, good ground for believing that it is a distinct alkali, but it has not been obtained in sufficient quantity to enable it to be subjected to ultimate analysis.*—*Pharm. Journ. from Proceedings of the Chemical Society.*

ART XXXVIII.—NOTE ON THE FRUIT OF THE MYROXYLON TOLUIFERUM.

By M. Leroy.

It is about a year since M. Méneir made known a species of fruit imported recently into France, and which was stated to be derived from a tree called by De Candolle, *myroxylon* or *myrospermum* toluiferum, and which belongs to the family Leguminosæ.

It is a pod, three or four centimetres long, two to three wide, inflated near the middle, furnished with a membranous wing at one of its sides, which gives it the aspect of the profile view of a caputchin, and presenting occasionally near the centre a depression, owing to the fact that the fruit sometimes contains two kernels, and sometimes but one.

The colour is dirty yellow, with black spots of various sizes, and which increase so much in some specimens as almost to hide the yellow colour. The surface is wrinkled longitudinally and a section of the peduncle presents numerous nerves which correspond with the wrinkles on the fruit.

*See vol. 8th, page 199 of this Journal for an account of the Bebeeru tree, etc.—*Ed. Am. Jour. Pharm.*

Most generally this fruit contains but one kidney-shaped thick kernel, and terminated at each end by a hemispherical surface; but in those cases where there are two kernels, the ends that are in contact are modified by pressure in the act of growing in contact.

The texture of the fruit is fibrous, and on each side of the kernel a cell filled with a resinous substance is observable which does not contain a particle of benzoic acid.

The kernel developes a very decided odour analogous to that of the Tonka bean. When chewed, it presents a biting acid taste at first, which is not persistent.

Heated in a small retort with an alcohol lamp, it carbonizes, and a blackish liquor, having a very disagreeable empyreumatic odour, passes into the receiver.

Treated by strong alcohol, it gives a tincture but little coloured, which, by slow evaporation in a moderately heated stove, deposited needle shaped crystals impregnated with an oily matter emitting a strong odour of coumarin.

These crystals present altogether the peculiar characteristics of the crystalline matter of Tonka bean and Melilot; they are heavier than water, not soluble in that liquid, entirely soluble in alcohol, less so in pure sulphuric acid. The solution diluted with water is precipitated in light flocks. They have no action on tincture of litmus and syrup of violets. These different properties place this crystalline matter among the proximate vegetable principles, and are sufficient evidence of its identity with *coumarin;* and that the fruit of the *myroxylon toluiferum* is the third substance in which this principle has been observed.—*Journal de Pharmacie.*

ART. XXXIX.—ON THE DETECTION OF POISON IN THE URINE.

By H. Letheby.

The author briefly referred to the experiments of Wöhler and Steyberger, Tiedemann and Gmelin, Orfila and others, in showing that many mineral, animal, and vegetable poisons are admitted into the circulation, and eliminated by the action of the kidneys.

These facts led him to inquire whether the various poisons might not be disposed of in a similar manner; and if so, whether their existence in the renal secretion might not furnish a hint for the treatment of cases of poisoning; and, also, whether their detection in the urine would not supply evidence of a very valuable character for the guide of the medical jurist.

With these objects in view, he analysed the urine of persons under the influence of the various poisons, and tested his results by experiment upon the lower animals.

He succeeded in detecting the following poisons:—sulphuric, muriatic, nitric, phosphoric, and oxalic acids; of the alkalies, he had discovered the presence of potash, soda, and ammonia; of the neutral salts, he enumerated nitrate of potash, iodide of potassium, sulphate of magnesia, the red and yellow prussiates of potash, and chloride of barium; of the salts of the other metals, he had recognised those of antimony, arsenic, lead, mercury, copper, iron, and silver.

With the view of detecting the organic poisons, the author instituted another class of experiments, the object of which was to ascertain if the vegetable poisons would, after their administration, endow the urine with any special physiological power over the system of another animal; and the conclusion to which he came was, that the active principles of many organic poisons, such as opium, belladonna,

hemlock, aconite, &c., would, in part, pass through the system, and appear in the urine unchanged.

With respect to the second question, as to whether their detection in the urine might not furnish a hint for the treatment of cases of poisoning, the author showed, from experiment upon animals, that diuretics were of great service in getting rid of poisons which had been administered to them, and thus helping them very considerably in their recovery.

The third question embraced by the paper, viz., whether the detection of the poisons in the urine might not supply evidence of a very valuable character for the guide of the medical jurist?—was proved to be an important one, inasmuch as the urine might be the only fluid or product at the disposal of the chemist; 2ndly, the evidence deduced from it might be of a positive, and, therefore, satisfactory kind; 3rdly, those poisons are recognised with more ease in this secretion than they are in the tissues; and 4thly, they may exist there to a larger amount than in any other part of the body.

A few other questions were referred to as having an important bearing on this subject, as—

1st. Whether every poison makes its way to the urine, and what are characters by which it is to be recognised?

2ndly. What is the smallest amount of each of the poisons capable, after its administration, of being detected in the urine?

3rdly. What is the earliest period at which the different poisons may be recognised, and what the latest?

4thly. Whether any relation existed between the quantity discovered in the urine, and the quantity administered?

5thly. Whether there are any circumstances which may increase the facilities for their elimination, and whether there are any which may diminish them?

These were questions which the author of the paper hoped to determine at some future period; at present, he believed that the facts, as they stood, warranted the following conclusions:—

1st. That many poisons are absorbed into the circulation.

2ndly. That those poisons are eliminated by the kidneys, and may be detected in the urine, either by their chemical or physiological reactions.

3rdly. That these facts, together with others from experiment, point to the value of diuretics in the treatment of cases of poisoning.

4thly. That it is possible to obtain, from an examination of the urine, some of the most valuable and certain evidences regarding the administration of a poison.

5thly. That we should not omit to examine this secretion in every case of suspected poisoning.

In the course of the paper, the author alluded to the presence of an excess of phosphates in the urine of persons occupied in the manufacture of lucifer matches, and referred it to the inhalation of phosphoric and phosphorous acids generated by the slow combustion of the phosphorus. He proposed a very simple remedy, that of exposing shallow vessels, containing turpentine, in different parts of the building, but especially in those situations where the phosphorus was most liable to oxidation: by this means he found that the vapour of turpentine would become diffused through the atmosphere, and so check that slow combustion of the phosphorus which was the source of all the mischief to the workmen.

Dr. Golding Bird remarked that the paper just read contained some points of great interest; the most interesting, however, being, probably, the least novel. Thus it was long ago demonstrated that the kidney carried from the circulation all effete and injurious matters that were held in the blood in solution, either in a changed or an unchanged condition. This latter law was of universal application, whether it related to saline or vegetable matters.

One of the facts mentioned in the paper confirmed the experiments made by Donne and himself, (Dr. Bird) that when oxalic acid was taken into the stomach, either as a

medicine or as it exists, combined with potash, in sorrel, it was afterwards found in the urine, forming crystals of oxalate of lime. Dr. Letheby had found it in combination with urea. The experiments on the mineral acids were evidences of the remarkable depurating action of the kidneys, as mentioned by German writers; but before we could judge of the value of these experiments, the data upon which they were made must be examined. He had no doubt of the accuracy of these researches, for it must be remembered that sulphuric and muriatic acids existed in the urine; the former becoming greatly increased if the person ate mustard or other articles containing sulphur. He had been a little surprised to hear that the mineral acids in a free state were so soon detectable in the urine; for though it was mentioned in books as possible, he had repeatedly tried to detect it, and had been vexed to find how different were the results to those he had expected. He might, indeed, observe, that he had never succeeded in making urine acid by the exhibition of the acids, except by the benzoic. He had given the sulphuric and nitric acids in cases of alkaline urine for weeks together, but had never succeeded in making that fluid acid. One of the facts stated in the paper was of a startling character, viz., that from three to five grains of arsenious acid might be safely taken into the stomach if the kidneys were stimulated to diuresis, as it would be carried off by this channel. He could not understand how this could be, unless, indeed, there was some short road to the kidneys not at present known; for the arsenic, before it reached these organs, must be absorbed into the circulation. It was difficult to understand how escape from the poison was effected. The experiments respecting the absorption of the metallic poisons confirmed the experiments of the best French chemists. His experiments, also, respecting the presence of antimony in the urine, from poisoning by that agent, confirmed the views of others.

Dr. Snow said that the difficulty of removing an alkales-

cent state of the urine, by the administration of the mineral acids, was no proof that these acids did not pass off by the urine; for in nearly all cases of alkaline urine it became alkaline after its secretion, from the decomposition of the urea, and such an amount of ammonia was produced in this way as it would be almost impossible to neutralise by any quantity of mineral acid which could be safely administered as a medicine.

Dr. Letheby observed, that the remarks of Dr. Snow had rendered it unnecessary for him to answer Dr. Bird, as far as regarded the detection of the mineral acids in the urine. He might observe, however, that in these experiments, the urine had been in the normal state, when, in fact, it was slightly acid, not when the phosphates were thrown out, as as these would, of course, neutralise the acid given by the stomach. After giving these acids, the urine became more acid, the acids being formed either in combination with their base or not; but this did not affect the question. He could not explain, any more than could Dr. Bird, in what way diuretics acted in cases of poisoning, but he had merely mentioned the facts which he had observed.

Dr. Copland, in 1821, had published a memoir on chemical remedies, and their mode of elimination from the system; and, in 1824, had experimented with the mineral acids and camphor. These experiments would be found in a forthcoming number of his "Dictionary." One circumstance which he had noticed in relation to these acids was, that the sulphuric was more easily detected than either the nitric or muriatic acids; but this he had supposed, at the time, to arise from the circumstance of the two latter acids being decomposed. He had found the same difficulty as had the author, in detecting vegetable substances in the urine, as turpentine, camphor, and other volatile substances were sooner carried off by the mucous membrane of the respiratory organs, than by that of the urinary. The depurating power of the kidneys had not been overlooked by

British writers, who had done as much in this respect as the Germans; the latter, however, had great tact in taking hints from us, and, as the Methodists would say, "enlarging" upon them. One fact might be mentioned in reference to the action of diuretics in stimulating the kidneys in cases of poisoning, viz., that often the excitement in the circulation was so great that the secretion of urine was altogether arrested. We should, in consequence, fail in the exhibition of diuretics, unless we first got rid of the congested state of the kidneys by depletion and diluents.—*Chem. from Royal Med. and Chir. Soc.*

ART. XL.—ON A NEW METHOD OF ESTIMATING NITRIC ACID.

By M. Gossart.

The examination of the oxidizing action of nitre under the influence of sulphuric acid has proved to me that, in a great number of cases, the products of this action may be rendered constant, and so furnish a large number of processes for the accurate estimation of nitric acid and the nitrates. In the following method I have been guided by the principle applied by M. Pelouze to the estimation of copper. In analysing crude nitre I employ as reagents,—1st, an acid solution of the protosulphate of iron;* 2nd, a very dilute solution of the red ferrocyanide of potassium.

I pour into a flask with a long neck 50 cubic centimetres of sulphuric acid of 1.704 spec. grav., and 25 of a solution

* The solution of the protosulphate which I have usually employed was strongly acid and nearly saturated.

of saltpetre containing 10 grms. of refined saltpetre in a demilitre; I then add, with a graduated burette, some drops of the solution of the protosulphate of iron, and agitate gently; the mixture becomes brown, suddenly clears again, and acquires a more or less deep straw colour. I then continue to add in drops a normal solution, the strength of which I wished to ascertain, waiting each time until the liquid brightens; when these changes of colour become less rapid, I apply a gentle heat; and when they are no longer perceptible, I examine whether, on taking a few drops with a pipette, they still yield a blue colour with the red ferrocyanide of potassium. When this blue colour appears, and no longer disappears on boiling the liquid, I note down the total number of the divisions employed. A second examination, in which a large number of the trials may be dispensed with, will yield an accurate result.

Let N be the number of divisions of the normal solution requisite to saturate completely 25 cubic centimetres of the solution of refined nitre; I weigh off 10 grms. of the saltpetre to be examined, which I likewise dissolve in a demilitre of water, and determine, in the same manner as was done for the solution of refined saltpetre, the number N^1 of divisions of the protosulphate of iron required to saturate completely 25 cubic centimetres of this solution; and the fraction $\frac{N^1}{N}$ gives the strength of the saltpetre under examition with great accuracy.

The process, which is applicable to the estimation of nitric acid, and of all the nitrates in general, may be employed for determining the quantity of nitric acid contained in gun-cotton. For this purpose, the whole of the cotton is oxidized with a mixture of sulphuric acid and peroxide of manganese; the liquid is filtered, and decolorized with a few drops of protosulphate of iron, which decomposes the whole of the sesquioxide of manganese before acting upon

the nitric acid. In this manner a solution is obtained containing the whole of the nitric acid which existed in the pyroxyline, and the amount of which may be readily estimated.—*Chem. Gaz., from Comptes Rendus.*

ART. XLI.—ON THE CONDITION OF THE APOTHECARIES IN THE INTERIOR OF AFRICA, according to the Verbal Information communicated by an Empirical Physician from Kartum. By X. Landerer, of Athens.

The condition of the Apothecaries in the interior parts of Africa, is truly miserable. In these persons, ignorance, cunning, and avarice are conjoined with charlatanry. They are called *Speziarides*, and their shops *Speziaria*. They are generally Jews, Armenians, and Turks, who have for some time, in Constantinople, assisted in a Chemist's shop, or lived with a *Hekim* (Physician.) or practised as *Serahs* (Surgeons) in an hospital. No particular permission by the authorities is required for opening a *Speziaria;* the whole license consisting in the possession of 2000 or 3000 piasters. The shop consists of a more or less spacious wooden moveable booth, in which medicines are exposed to view on wooden shelves in glass vessels, boxes, and sacks. Immensely large white glass bottles with glass covers, on which usually are fixed oil-lamps, in which the oil swims on two or three kinds of differently coloured liquids, contain the best samples of indigenous and exotic products, such as senna, gums, tamarinds, cassia, sarsaparilla, corrosive sublimate, sulphate of copper, corallia, margaritæ, spongiæ, lapides spongiarum, &c., &c. In the middle of the shop

stands a little table, on which is a small standing pair of scales, with some small hand-scales hanging up. There are also some *Argelledes*, or Turkey tobacco-pipes, with elastic tubes, for the Hekims or Serahs, who come there either to wait for their patients or pass their time in chatting and smoking. They generally come very early, and spend almost the whole day in the shop, sitting cross-legged. As weights, grains of sesamum, or of wheat, and date-stones, are used. The arrival of a patient often serves as a bone of contention and quarrel among the Serahs, each of whom tries to obtain the custom of the patient, who not unfrequently selects him who offers to undertake the cure for the smallest sum. The fee is a quarter of a ducat for a consultation and prescription at the Speziaria; but when the Hekim goes to the house of the patient, he receives, in the case of a wealthy man, from three to five or ten gold pieces, which a servant presses into his hand. The Speziaris, or Apothecary, who has an understanding with the Hekim, charges not much less for the medicine. If the disease requires longer attendance, a contract is made between the physician and patient at the first visit for attendance and medicine; and half of the sum agreed on is paid down immediately, while the other half remains until the cure is completed. In chronic diseases, some thousands of piasters are asked. An Arab assured the writer of this, that he had to pay 8000 (?) piasters for being cured of jaundice, besides the medicines, which, being prepared of gold, cost him 5000 (?) piasters more. If the patient dies, the Physician obtains nothing more, but must be content with what he received in advance. In cases where a patient has been cured of a very dangerous illness, the Hekim receives, besides his fee, additional presents, consisting of costly confectionaries, tobacco-pipes with amber mouthpieces, aloe-wood, horses with beautifully and richly ornamented trappings, &c. &c. In particular cases, and in the night, a horse is sent with from five to ten servants to fetch

the Physician, who frequently receives for such a visit thirty ducats.

All compounded medicines are imported by the Apothecary from Alexandria, Cairo, and Constantinople; but the more simple ones he prepares according to his own pleasure, or after a *kital, i. e.*, a manuscript which goes down from father to son. A great many objects of natural history are also to be seen in the Apothecary's shop: for example, ostrich-eggs, serpents, ichneumons, crocodiles, lobsters, river fish, elephants'-teeth, sea-shells, coral stones, sponges, pearl-shells, &c., from all of which snbstances costly medicines are prepared. Thus, from the eggs of the ostrich, perfumed balsams are prepared as antidotes against corrosive sublimate and arsenic; and also a *matsun* (electuarium) against dysentery and rheumatism. From embalmed serpents and toads, tinctures are prepared for strenghtning the nerves, and in these gold and silver leaves are floating, thus proving that the medicine is prepared from pure gold and silver. From the bones of the ibis a mass is prepared, which is formed in brass moulds, and sold as amulets against the bite of serpents. From the ichneumon is prepared with oils a very strong smelling ointment, which is used for wounds produced by the crocodile. In large glasses, bleached camel's-hair is preserved. This is employed to stop hæmorrhage from wounds, by strewing the finely cut hairs in the wound. Furthermore, the Speziarides prepare from pearls a tincture for contagious diseases, and as a proof that it is actually prepared from pearls, undissolved pearls are seen floating about in glasses filled with some red coloured liquor. The different bezoars form in these countries important articles. Bezoars of the serpent, the crocodile, the buffalo, and the camel, are to be seen of extraordinary size, set in gold, and ornamented with pearls, in the most beautiful glasses, or hanging about in the shop.

The *matsuns* (electuaria) form, among the Africans, one of their principle forms of medicines; and accordingly we find that for each disease there is a particular matsun. Thus, they have matsuns of dates and of bananas against dysenteries, complaints of the chest, &c.

The minor surgical operations, such as bleeding, opening of abscesses, &c., are performed by the Speziarides, and that in the open street, in order to attract the attention of the passers by, who often collect around the Serah or Speziaris and his patient in great crowds, amongst whom there are not unfrequently hired spectators, who cry up the skill of the operator.

Chemical operations are also publicly performed; for example, the distillation of the *liquor Hoffmani*, or some aromatic spirits, &c.

It is very difficult, for foreign physicians (*i. e.* Europeans) to establish themselves in these parts; for they are persecuted by the natives in every possible manner. The latter exert all their power of persuasion to convince the higher classes that European Physicians are not acquainted with the climate, and that they effect the cure by the assistance of Satan, or that they employ poisonous substances, which do indeed possess the power of temporarily checking and apparently curing the disease, but that this, in a short time, breaks out again with augmented virulence. When an European Physician is patronized by one of the European Consuls, and is recommended by him to some of the higher families, whose confidence he contrives to gain, he may succeed in amassing, in a few years, a large fortune; but otherwise he is often scarcely able to gain his daily bread. —*Pharm Journ. from Buchner's Repertorium.*

ART. XLII.—ON CHINESE PHARMACY.

The drug shops of China are large, and are commodiously fitted up. They have a great array of drawers and jars arranged much in the same way as in England; glass vessels are very rare. Different departments are allotted to separate classes of medicaments; care is taken to keep things in order; and there is a degree of neatness and method in their appearance which would not be discreditable to a London laboratory. They do not seek notice by party-coloured bottles and cabalistic signs, which make so great a figure in the windows of some English medicine venders, but are rigorously plain, and, as far as mere appearance is concerned, appropriate.

On examining the contents of the drawers, boxes, &c., few things were observed identical with, or similar to, the medicinal substances employed in Europe. Camphor, rhubarb, and liquorice, were conspicuous among recognised articles; but our familiar friends in the shape of purging salts, calomel, tinctures, &c., were nowhere found. Even opium, of which so much is used as a luxury, does not appear to be admitted in the materia medica; at least it could not be traced in any form in the drug-shops. Cinnabar, or a substance much resembling it, is a favorite remedy in many external diseases, and it consequently is a prominent article in every collection.

On the Druggists' counters are ample boxes containing preparations for such purposes as these—to arrest cholera instantly, to communicate strength directly, to infuse courage, to excite love, and to confer the faculty of being loved, and so on, in proportion to the wants and wishes of individuals. This is sufficiently ridiculous, but is not more so in reality than the pretensions to similar efficacy constantly

put forth in more enlightened places, and is probably much less mischievous. The Chinese panaceas, hero-making mixtures, philtres, and medicated charms, are believed to be generally harmless, which is more than can be predicated of many of the compounds so much vaunted and consumed in England under the name of antibilious, antidyspeptic, antinervous, *antiomnia mala* medicines.

For a small fee, not equal in value to a shilling, the Chinese physician, after examining the pulse, exhibiting great interest in the welfare of the patient, and profound knowledge of his case, writes a recipe, which, in imposing appearance, would put to shame the most elaborate performance of a London Professor. It occupies generally a large sheet of paper, is often diversified by red, added to the ordinary black characters, and is altogether a learned and laborious-looking composition. When carried to the Druggist, he spreads it on the counter, examines it attentively, and then proceeds to dispense *secundum artem*. Many ingredients, seldom less than nine or ten, make up the total of articles prescribed; they are almost always powders, sliced roots, or other dry substances, fluids being seldom sent from the apothecary's store. For each a separate piece of paper is laid out in regular array, some white, and others red; the former are the most numerous, and to them the most common simples are consigned, the crimson being reserved for those which are most powerful, or more highly esteemed, such as ginseng.

Surgeons dispense their own medicines, and local appliances, and do a little, what they can, in short, in way of medical prescription, to any who will apply for it. They hold nearly the place of the English general practitioner, but their shops are generally poorly furnished, and neither their employment nor profit is on a large scale.

The department of the Druggist is more lucrative than that of the Surgeon; for as the people are fond of physic, and they have no desire to balk the inclination, they not only give on every possible occasion, but give liberally. As

an example of the latter disposition, it was observed that five balls, larger than marbles, to be taken at once, were prepared for some form of bowel complaint. It might be assumed that they did not possess very active ingredients; but how the patient, without the assistance of a probang, contrived to gorge them was the wonder. Men who should order or issue such perilous looking pellets in England, would be considered fit to deal with the diseases of horses only.

The Chinese Pharmacopœia, or rather Materia Medica, is a work of great magnitude; a brief epitome of it in the writer's possession extends to upwards of 1300 octavo pages.

Ginseng is the paramount promoter of health, and prolonger of life. It is said to possess astonishing power, not only of sustaining, but restoring the human frame, and is regarded with a degree of admiration bordering on religious adoration. No one's case need be considered desperate who can procure this, the *pabulum vitæ*, in abundance; but it is so costly, as to be beyond the reach of the great proportion of the afflicted. Generally it is, except in very small quantities, an article of sale by itself, the man who deals in it, dealing in nothing else; and it cannot be procured in every drug-shop. At Tinghae, the writer visited a ginseng repository, which was a most unpromising and barren-looking place. The commodity is too precious to be displayed at windows or deposited on shelves. Strong boxes behind a rampart of counters alone appear; there it is rigidly kept, disposed in small cases, each of which contains about a drachm weight. A stranger well introduced, or a person of known character, may look at, but not touch it, till he has paid the price. Proverbially it is represented as worth more than its weight in gold, which is confirmed by common practice; for the dealer alluded to asked, as a matter of course, for a bit shown, at the rate of twenty-five dollars an ounce.—*Ibid, from Dr. Wilson's Medical Notes on China.*

ART. XLIII.—ON THE CARDAMOMS OF ABYSSINIA.

By Jonathan Pereira, M. D., F. R S.

Two or three centuries ago, a large scitamineous fruit was employed in medicine, on account of the aromatic qualities of its seeds, under the name of *Cardamomum majus*. Cordus describes it as being a fruit like Melligetta, but smaller, turbinate like a pear, and having seeds which are agreeably aromatic. The fruit, he says, has been erroneously confounded with the Melligetta, but the flavour of the former, he adds, is much less hot than the latter, and is grateful and pleasant; whereas, the taste of Melligetta is very acrid, and like pepper. He furthermore tells us, that both the fruit and the seeds of Cardamomum majus are brought from Syria and Egypt.

This fruit has long since disappeared from commerce; but specimens of it are occasionally to be met with in some old collections of Materia Medica, and in that of Dr. Burgess, in the possession of the Royal College of Physicians of London, are several fine capsules of it, marked "*Cardamomum maximum Matthioli.*" One of these I have described and figured in the *Elements of Materia Medica*, p. 1026, fig. 195, 2d edit., and believing it to be identical with the *Amomum angustifolium* of Sonnerat and of Sir J. E. Smith, and the *Amomum Madagascariense* of Lamarck, I have adopted Sonnerat and Smith's name of *Amomum angustifolium*.

This cardamom is one of the fruits which, by some later writers in the Materia Medica, have been confounded with *Melligetta pepper* or *grains of paradise*.

About four years ago I received from my friend Dr. Royle some cardamoms which, he informed me, came from Abyssinia. In a letter which I have subsequently received

from him, he says, that they were "brought strung on a string, and were sent to the India House by Major Harris's embassy. They were described as being carried to Abyssinia from Guraque, which is more to the southward, and where they might easily be produced. But I believe there is also some commerce up the rivers still further south, so that they might be produced even in Madagascar, and be sent as a spice to Abyssinia. But I should suppose they were more likely to be the produce of the interior, and probably of Guraque as they are called *Guraque spice.*"

These cardamoms I found to be identical with the fruit, which I had figured and described in my *Elements of Materia Medica*, under the name of *Amomum angustifolium*. The specimens, however, were scarcely so large as those I had previously seen, and were perforated for a string, apparently for the purpose of hanging them up to dry.

About a year and a half ago I received from Mr. Charles Johnston, the author of *Travels in Southern Abyssinia*, other specimens of the same fruit, and subsequently obtained from him the following information respecting them :—

"I hasten to answer your inquiries with regard to the cardamoms; and first of their place of growth. This I was given to understand was chiefly in the deep valley of the Abiah branch of the Bahr al Azzareeke, those you have received coming from that part of it which separates Guraque from Zingero. I have heard though, that, still further to the south, they are found in greater quantities, insomuch so, that the locality has received the name of the spice country, and as it was represented that extensive forests (? jungle) of the plant which produces them existed, we may presume, I think, that this land of spices is their indigenous country. As to the mode of preparing them for use, from the opportunities I had of observing the attention paid to cultivation in Abyssinia, I should suppose that it was the same in Guraque, and that the simple course of gathering the fruit, and drying them in the sun was all the inhabi-

tants did to preserve the produce of their spice harvest. I must not forget though, that, for convenience of carriage and the usages of trade, each cardamom capsule is perforated and strung upon a strong thread in numbers varying from forty to fifty, for which, in the markets of Shoa, a distance of five day's journey, the priest merchants of Guraque can obtain one piece of salt-money, or about twopence-halfpenny in English money, but which, it must be observed, is sufficient to purchase at least two pecks of wheat in that country. The Abyssinians seldom use the cardamoms except for medicine. Its employment in domestic economy is certainly not so general as the nutmeg is with us."

Within the last few days I have received some specimens of the same fruit, under the name of *Korarima*, from Dr. Beke, to whom I am farther indebted for the following information respecting this cardamom:—

"The *Korarima*, in Arabic called *Khéil* or *Khil*, is brought to the market of Báso, in Southern Abessinia, from the country of Túmhe, in Wallégga, an extensive level, and in great part desert region, which stretches from the river Dedhésa, the upper course of the Bahr el Azrek, or Blue River, as far as the Bahr el Abyad, or true Nile to the west, and the Gódjeb, a tributary to the latter now, to the south; northward it is bounded by the country of the Dínkas.

"The position of Túmhe is somewhere about 9° N. lat. and 35° E. long. Túmhe is usually known among the native merchants as "*the country of the Korarima;*" and I have a map drawn by one of them in which it is so marked. But I was assured by others that it is not the growth of that country, but comes from other portions of Wallégga beyond it. As the land slopes westward from the high mountain country of Abessinia down to the valley of the Nile, I conclude that it is the produce of districts possessing an absolute elevation of probably not more than about 3000 or, may be, 4000 feet. This is in lat. 8° or 9° N.: nearer, that is higher up, than Túmhe it certainly is not found.

"The *Korarima* is brought in considerable quantities by the way of Báso to Abessinia, in which country, as likewise among the Gallas further to the south, it is used as a condiment. I purchased at Báso one hundred heads for one *ámule*, a piece of rock-salt, of which about twenty are current there for one Austrian convention dollar, worth about 50$^{d.}$—consequently forty for one penny sterling. As a stranger I probably paid the *full* price. It is also taken to Massòwah, the port of northern Abessinia, on the Red Sea, from whence it is exported to India. Dr. Rüppell was informed at Massówah that the annual export is of the value of one thousand dollars—about £200 sterling.

"The specimens sent you are not so large as some that I had; but I believe they are of a fair average size.

"I should add, that *Korarima*, is the Galla name, which is likewise used in Abessinia. The accent is on the penultimate, and the vowels being sounded as in Italian, the name is pronounced as if written in English *Korahreema*.

"With respect to the Arabic name *Khíl* it should be remarked, that according to the Kamús, it means "Rue," or rather *Peganum Harmalah*. The word does not occur in Ibn Baítar's *Materia Medica*, and would appear indeed be to but little used by the Arabs. Nothing, however, is more uncertain than the real value of Arab names of plants, and several plants of very different characters, are no doubt to be met with under the same appellation. Nevertheless, the fact is certain, that at Massówah, and in the Red Sea, the *Korarima* is designated *Khéil* or *Khíl*, by the Arabs."

This fruit is best distinguished from other large scitamineous fruits, with which it has been confounded by the characters of its seeds; which are devoid of the fiery peppery taste of the grains of paradise; are not highly polished, dark brown, and oblong, or ovate, or cylindrical, like the seeds of the *Amomum Clusii;* nor are they greenish grey or lead-coloured, like those of *Amomum macrospermum*. But they are mildly aromatic, somewhat smooth, compressed or angular, and pale olive brown.—*Pharm. Journ.*

ART XLIV.—ON THE PRE-EXISTENCE OF AN ESSENTIAL OIL IN STARCH.

By M. Payen.

Many years ago the author asserted the pre-existence of an essential oil in starch, which was denied by most chemists and especially by Liebig. In proof of the correctness of his view, he now brings forward the following experiments:—500 grms. of starch were gradually added to three litres of boiling water, which had been acidified with 0.005 sulphuric acid, contained in a vessel capable of holding 6 litres; the condensation was effected in an apparatus similar to that which the author has described in the separation of the aroma from coffee. About half a litre of water condensed in the first two recipients; in the third, towards the end of the operation, some cubic centimetres of water; and in the fourth, which was surrounded by ice, only a few drops. The water in the first two recipients possessed the odour of the starch, and was covered with a whitish pellicle, which dissolved in ether and solidified on cooling. The water of the third recipient had a very strong odour of starch, and was covered with a layer of essential oil; by uniting the collected essential oil the author obtained 0.08 grm. of it. It was liquid, yellowish, had a very strong odour of starch, and at all events a lower boiling point than that of water. The water poured from the oil still yielded 0.018 of oil; so that the starch contains at least 0.0001 part by weight of essential oil.—*Chem. Gaz. from Comptes Rendus.*

ART. XLV.—HISTORY OF THE INTRODUCTION OF GUTTA PERCHA INTO ENGLAND.

By Dr. Wm. Montgomerie.

Having in many late numbers of the *Mechanics' Magazine* seen frequent notices of the patents taken out for the application of the new substance, *gutta percha*, to various purposes, and its extensive usefulness becoming daily more apparent, it has occurred to me that as I was the person through whom the substance was first brought to the notice of the public, a few observations from me regarding it might be valued by many of the readers of your highly popular and useful journal.

I may not arrogate to myself the actual discovery of *gutta percha;* for, although previous to my introduction of it, it was quite unknown to Europeans, still it was known to a few of the inhabitants of certain localities of the Malayan forests; but even most of the native inhabitants of the towns and villages near those localities, to whom I showed it, did not know what it was, and it was likely to have remained unknown from the very trifling uses to which it was applied, being, as far as I could ascertain, only occasionally used to make handles for *parangs*, (wood choppers,) instead of wood or buffalo horn.

As far back as 1822, when I was on duty at Singapore as assistant-surgeon to the residency, I had obtained the *name* of it, while making inquiries relative to caoutchouc, of which there are several varieties; and some very fine specimens were brought me, particularly one called *gutta girek* (the *i* sounded as in Italian, and the *k* almost mute;) and I was told that there was another variety called *gutta percha*, and sometimes *gutta tuban*, which they said was harder than the *gutta girek;* but none of it was brought to me

at that time, and I lost sight of it, having returned to the Bengal presidency. But being again sent on duty to the Straits settlements, and while at Singapore, in 1842, I on one occasion observed in the hands of a Malayan woodsman the handle of a *parang*, made of a substance which appeared quite new to me. My curiosity was excited, and on inquiry I found it was made of the *gutta percha*, and that it could be moulded into any form by simply dipping it in boiling water until it became heated throughout, when it became plastic as clay, and when cold, regained, unchanged, its original hardness and rigidity.

I immediately possessed myself of the article, and desired the man to fetch me as much more of it as he could get.

On making some experiments with it, I at once discovered that, if procurable in large quantities, it would become extensively useful; and even if only in small quantities, it would still be invaluable in the formation of many surgical instruments, particularly as a substitute for caoutchouc in many of the articles made of that substance, as I had found that those instruments which were made of caoutchouc, which had been dissolved in naptha, or other solvent, became speedily damaged, and totally useless in the damp and hot climate within the tropics. I therefore wrote to the Medical Board in Calcutta, strongly recommending its adoption, and sent specimens of the substance. After having examined it, the Board highly approved of my suggestion, and directed me to procure and send some of it to Calcutta, which was done.

I also addressed a communication to the Secretary of the Society of Arts, London, and sent some of the substance for investigation and analysis, for which, after my return to England, I had the honour to receive the Society's gold medal.

Being in bad health at the time the substance was brought under my observation, I was unable to prosecute the inquiry in the way I could have wished, not being able to go

in person to the forest, and was therefore obliged to satisfy myself with such information as the natives could give me. I ascertained, however, that the tree producing it is one of the largest of the forest, growing to the size of three or four feet diameter; that the wood is of no value as timber, but that an edible concrete oil is procurable from the fruit, and often used by the natives with their food.

On extending my inquiries, I found the substance was quite unknown to the people at Malacca, although that place is only about a degree to the north of Singapore, and was told that the natives of the island of Sumatra did not know it, although at first I was inclined to suppose that the substance might have obtained its name from that island, the Malayan name for the island of Sumatra being "Pulo Percha."

I ascertained, however, that the tree was common in many places in the island of Singapore, and also in the forests of Johore, at the extremity of the Malayan peninsula; and was informed by the Buggese traders that it grew at Coti, on the south-eastern coast of the island of Borneo; and on requesting Mr. Brook to inquire about it at Sarawak, on the west coast, was informed by that gentlemen that it was found in the forests there also.

The following is a quotation from Mr. Brook's communication to me: "The tree is called *Niato* by the Sarawak people, but they are not acquainted with the properties of the sap; it attains a considerable size, even as large as six feet diameter; is plentiful in Sarawak, and most probably all over the island of Borneo."

I have reason to believe also that it is abundant on the thousand islands that cluster to the south of the straits of Singapore.

That it is very abundant is satisfactorily proved from the circumstance of its being now collected at Singapore to the extent of some hundreds of tons annually, although unknown to the public in 1842. But although the tree is at

present sufficiently plentiful, yet the substance, I fear, will become soon more difficult to be procured, from the destructive mode pursued by the natives in obtaining it.

A magnificent tree of fifty, or more probably 100 years' growth, is cut down, the bark stripped off, and the milky juice collected and poured into a trough formed by the hollow stem of the plantain leaf; it quickly coagulates on exposure to the air; but from one tree, I was told that not more than 20 lbs. or 30 lbs. are procured.

I believe, however, that the juice may be obtained by tapping the tree, and that it might thus be made to produce in moderate quantities for many years; but this mode is too slow for the natives. Besides, although the first discoverer of a tree might be inclined to do so, the next who found it would, probably, cut it down, their being no property in the trees of the forest, excepting where grants of land have been given.

Allow me, now, to correct an erroneous mode of pronouncing the name, which I have observed used by many gentlemen with whom I have conversed on the subject. The word is a pure Malayan one, *gutta*, meaning the gum or concrete juice of a plant, and *percha*, the particular tree from which this is procured. The *ch* is not pronounced hard like a *k*, but like the *ch* in the English name of the fish perch. Had I thought there was a probability of the name being mispronounced, I might have used the uncouth orthography, per*t*sha, but it would have run the risk of being taken for a Russian or Polish name. Some of your readers may think I place too much value in a name; but in these days, when public attention is beginning to be attracted to the affairs of the "farther east," and the spirit of enterprise is leading many of our countrymen to explore those interesting regions, if one of them were to inquire of a Malay for gutta *perka*, he would be told the thing was unknown, when perhaps plenty of the *gutta percha* might be procurable by pronouncing the name properly.

Among the various uses to which it has been proposed to apply the *gutta percha*, I have observed some for which its properties render it peculiarly applicable, and one in particular, printing for the blind, for which the clear sharp impression it receives, and the toughness of the substance, admirably suit it, as well as in the formation of embossed maps for that unfortunate class.

As an application of it of minor importance certainly, but one of very general usefulness, it has been suggested to me that it would be found useful in stopping decayed teeth.—*Pharm. Journ. from Mechanics' Magazine.*

ART. XLVI.—CHEMICAL EXAMINATION OF GUTTA PERCHA.

By J. G. Scott.

Of the Honourable Company's Dispensary, Calcutta.

The *gutta percha* forwarded to the Medical board, by Dr. Montgomerie from Singapore, is one of those neutral vegetable substances, of which a proximate analysis cannot be made. On a careful examination, I have found it to possess the following properties:—

It is insoluble in water and in alcohol; soluble in volatile oils, and partially so in ether, from a solution of which it is precipitated by alcohol.

It melts when exposed to a temperature of 248°, and on cooling, remains in a semifluid adhesive state. When heated sufficiently in the open air it catches fire, burning with a strong yellow flame, and emitting much smoke.

On distillation it furnishes a volatile oil, similar in all its properties to *caoutchouc.*

It is insoluble in petroleum and in nitric ether.

The *gutta percha* is in thin films, varying in colour from a pale yellow to a pinkish tinge, and is destitute both of taste and smell. It is hard at a common temperature, but when immersed in boiling water, it softens so much, as to be capable of being beaten into a mass, and formed into any shape required; this, however, must be done immediately, for the mass on cooling becomes hard and unyielding.

When in a soft state, it can be stretched out into thin slips much beyond its usual length, but it does not recover its former bulk when the force is withdrawn. The slips are transparent and elastic.

I feel no hesitation in pronouncing the *gutta percha* a species of *caoutchouc*, possessing unquestionably some of its principal properties, but it is a species which I believe has not been examined before.—*Pharm. Journ. from Journal of the Agricultural and Horticultural Society of India.*

ART. XLVII.—ON A NEW TEST FOR PRUSSIC ACID, AND ON A SIMPLE METHOD OF PREPARING THE SULPHOCYANIDE OF AMMONIUM.

By Professor Liebig.

When some sulphuret of ammonium and caustic ammonia are added to a concentrated aqueous solution of prussic acid, and the mixture heated with the addition of pure flowers of sulphur, the prussic acid is converted in a few minutes into sulphocyanide of ammonium. This metamorphosis depends on the circumstance, that the higher sulphurets of ammonium are instantly deprived by the cyanide

of ammonium of the excess of sulphur they contain above the monosulphuret; for instance, if a mixture of prussic acid and ammonia be added to the pentasulphuret of ammonium, the solution of which is of a deep yellow colour, and the whole gently heated, the sulphuret of ammonium is soon decolourized; and when the clear colourless liquid is evaporated, and the admixture of sulphuret of ammonium expelled, a white saline mass is obtained, which dissolves entirely in alcohol. The solution yields, on cooling or evaporation, colourless crystals of pure sulphocyanide of ammonium. Only a small quantity of sulphuret of ammonium is requisite to convert, in the presence of an excess of sulphur, unlimited quantities of cyanide of ammonium into sulphocyanide; because the sulphuret of ammonium, when reduced to the state of monosulphuret, constantly reacquires its power of dissolving sulphur and transferring it to the cyanide of ammonium. The following proportions will be found to be advantageous:—2 oz. of solution of caustic ammonia of 0.95 spec. grav. are saturated with sulphuretted hydrogen gas; the hydrosulphate of ammonia thus obtained is mixed with 6 oz. of the same solution of ammonia, and to this mixture 2 oz. of flowers of sulphur are added; and then the product resulting from the distillation of 6 oz. prussiate of potash, 3 oz. of the hydrate of sulphuric acid, and 18 oz. water. The mixture is digested in the water-bath until the sulphur is seen to be no longer altered and the liquid has assumed a yellow colour; it is then heated to boiling, and kept at this temperature until the sulphuret of ammonium has been expelled, and the liquid has again become colourless. The deposited, or excess of, sulphur is now removed by filtration, and the liquid evaporated to crystallization. In this way from 3½ to 3¾ oz. of dazzling white dry sulphocyanide of ammonium are obtained, which may be employed as a reagent, and for the same purposes as the sulphocyanide of potassium. Of the 2 oz. of sulphur added, ¼ an oz. is left undissolved.

The behaviour of the higher sulphurets of ammonium towards prussic acid furnishes an admirable test for this acid. A couple of drops of a prussic acid, which has been diluted with so much water that it no longer gives any certain reaction with salts of iron by the formation of prussian blue, when mixed with a drop of sulphuret of ammonium and heated upon a watch-glass until the mixture is become colourless, yields a liquid containing sulphocyanide of ammonium, which produces with persalts of iron a very deep blood-red colour, and with persalts of copper, in the presence of sulphurous acid, a perceptible white precipitate of the sulphocyanide of copper.—*Chem. Gaz. from Liebig's Annalen.*

ART. XLVIII.—ON THE CHANGES PRODUCED ON SOME DRUGS AND PHARMACEUTICAL PREPARATIONS BY THE SOLAR RAYS.

By Mr. Robert Hunt.

It has long been noticed that a peculiar change is frequently produced by the continued exposure of medicinal preparations to the influence of daylight, a change not merely in the colour of the article, but in its medicinal properties. To adduce a few instances, ginger (pulv. zingiberis Jam.) loses its fine yellow colour, and becomes white, with loss of its pungency. The powders of the leaves of hemlock (conium,) foxglove (digitalis purpur.) henbane (hyoscyamus,) &c., becomes a dirty yellow, and when this change has taken place, it is well known that no dependence can be placed upon these active drugs producing their peculiar influences on the system. The powders of

the roots of jalap and ipecacuanha become pale, and, particularly the former, are rendered comparatively inert. The tinctures of cascarilla, catechu, kino, and frequently cinchona, deposit a considerable portion of the vegetable matter held in solution by the spirit on the side of the bottle exposed to the most light; the same result takes place with some others. In chemical preparations, many very remarkable changes take place, which need scarcely be particularized. The changes in oxide of silver, in oxide of mercury, and in nitric acid, have frequently been described. The effect of even diffused light on hydrocyanic acid is familiar to every Druggist, and there can be but few who have not observed alterations in the character of the peroxide of mercury (red precipitate) and the chloride of mercury (calomel) by the action of the sun's rays. The bleaching of the fixed oils and of wax need scarcely be mentioned, but the influence of light upon the resins, with the exception of guaiacum, was never pointed out until the publications of M. Niepce's photographic researches.

I am not aware that any investigations have been made into any of these changes: I am therefore induced to trouble you with a few remarks, the results of experiments which have extended over some years, and which, although far from complete as a scientific investigation, have the merit of some practical and really important applications. I shall not detail my experiments, which have been very numerous and frequently repeated, but, for the present at least, content myself with giving the general results of these researches.

It will be necessary, however, to describe the mode adopted by me in this examination, and the various conditions under which the experiments were made. Having selected the bright green powder of the leaves of the medicinal plants, carefully dried in the dark, and powdered by myself, it was placed in dry and warm glass tubes, and these were then hermetically sealed. Some of these tubes

were placed aside in a dark cupboard to serve for comparison with those exposed to light; other tubes of powder were now exposed, day after day, to the action of the rays of a prismatic spectrum, which was maintained in a fixed position, by means of a good heliostat. The tubes were so placed across the spectrum, that each tube was kept under the influence of a particular ray. Although I frequently placed seven tubes in the seven rays of the spectrum I generally used only three, for the following reasons. Sir David Brewster considers that there are but three primitive colours in the solar beam—red, yellow, and blue; and that all the other colours are but compounds of those rays with each other. My researches have proved to me that the three great phenomena of the solar radiations—LIGHT, HEAT, and CHEMICAL ACTION—have their points of maximum power in three distinct parts of the spectrum; the red rays giving the largest amount of calorific power, the maximum intensity of light residing in the yellow rays, and the chemical power being greatest in the blue rays. It will, therefore, now be seen that by using three tubes only, the vegetable powder under examination was exposed to the influence of the heat of the suns ray's—to their light—and to their chemical, or, as I have proposed to term it, ACTINIC power. By this arrangement I soon ascertained that the decolorization of green vegetable powders was not due to the influence of LIGHT, as the powders exposed to the full intensity of yellow light, in which we have the maximum of luminous influence, underwent no change—the alteration of the colour was in nearly all cases, but not in all, first set up under the influence of the red rays. No great difference could, however, be detected between the action of the red and blue rays. Hence we learn, that the change in question is due to the action of the heating and chemical principles of the sun's rays. By using two spectra, and so arranging them that the blue ray of the one fell on the space occupied by the red-ray of the other, we are enabled to examine the com-

bined action of these rays—and I have always found the result to be a very rapid bleaching of all green vegetable powders. The bleaching of the brown and yellow powders —jalap, bark, and ginger, is due almost entirely to the blue or chemical rays. The chemical examinations which I have made of the bleached powders, appear to show that an absorption of oxygen takes place under the action of the chemical rays—but that the heat rays exert their power principally, if not entirely, in removing an atom of combined water.

It will not be difficult to understand how very important the changes effected in the constitution of the organic body must be, when we consider the very great differences in medicinal effects produced in chemical compounds, by the addition or subtraction of an atom of oxygen or of water.

These remarks and results apply with equal force to the resins and the fixed oils. The bleaching of the fixed oils appears to depend almost exclusively on the action of the blue and indigo rays of the spectrum, and although the thermic rays produce a little effect upon the resins, it is in no respect to be compared to the action of the actinic rays, which appear to liberate a portion of oxygen, by which, solarized is rendered much more soluble than unsolarized resin. The conversion of linseed oil into a substance resembling caoutchouc under the influence of the air, is very materially modified by the action of the sun's rays, the blue rays accelerating the absorption of oxygen, and the yellow and red rays retarding it.

All the changes which have yet been examined upon the salts of the metallic oxides, appear to be due entirely to the influence of the blue and violet rays, and the alterations in colour and character are dependent upon the liberation of one atom of the gaseous element from the compound. The phenomena connected with these changes are now under investigation by the author of this paper, and will shortly be published in another form.

The decomposition of the hydrocyanic acid under the influence of the solar radiation is also due to the chemically active rays, and I have found that the change has been effected more speedily in the blue and indigo rays than in any others. We have in this case the formation of ammonia, and the precipitation of a brown powder which appears to be a compound of nitrogen and carbon.

Such is a general outline of the results to which my researches have at present led me. It is a very common practice for Druggists and manufacturers to put those pharmaceutical preparations which are liable to change by light into dark purple-coloured bottles, or to cover white glass bottles with blue paper, with the idea that the quantity of *light* admitted is then so small that no change can take place. We learn from these investigations, and the knowledge is of great practical importance, that no plan more efficient for producing rapid decomposition could be adopted than the use of blue glass bottles. Light positively acts as an interfering agent—this light is obstructed by the dark blue glass, and the pure or nearly pure chemical rays are permitted to act on the preparations with all their energy. If instead of using those kinds of bottles, others prepared of a neat form from the ordinary dark green bottle glass were adopted, there would be but little fear of any decomposition from the solar radiations. Not only does this kind of green glass obstruct the rays of light to a great extent, but nearly all the calorific rays are shut off, and the actinic or chemical rays are reduced in quantity and force in a very remarkable manner.

For bleaching oils there can be no question but purple bottles would be by far preferable to any other colour for the reasons above explained.—*Pharm. Journ.*

XLIX.—RESEARCHES IN ANIMAL CHEMISTRY.

By Prof. J. Liebig.

I have latterly made a series of researches on the nature of fluids, which belong neither to the sanguineous nor lymphatic vessels. The Academy will permit me to draw its attention to the results I have obtained. We know long since that the meat of animals recently killed presents a reaction decidedly acid. M. Berzelius has attributed this property to the existence of lactic acid, without, even to the present moment, analytical results having proved the fact in an irresistible manner. Many chemists have admitted the existence of lactic acid in the urine, in the gastric juice, and in the milk, but they supported the conclusion of its existence in those liquids, on reactions which do not possess great certitude. Even the opinion that lactic acid hinders the precipitation of oxide of copper by the milk of lime, rests on an error. M. Strecker has lately shown that the lactate of pure copper is perfectly decomposed by the milk of lime, and in the supernatant liquid, no reaction demonstrates the presence of oxide of copper. It is true that the lactate of pure lime dissolves a trace of oxide of copper; but a slight excess of lime water precipitates it entirely.

My researches have aimed at putting an end to this incertitude in respect to the non-volatile organic acid, which constitutes a part of the animal organism.

When the flesh of animals recently killed and beaten into a pulp is washed with cold water, a red liquor is obtained, which, heated to ebullition, gives a coagulum of albumen, and is almost entirely deprived of colour. The limpid liquid, scarcely yellowish, obtained in this manner, possesses a very decided acidity and a very aromatic and agreeable flavor of boiled beef. When neutralised by barytes water, there is precipitated phosphate of barytes and phosphate of mag-

nesia; it becomes slightly alkaline, without any barytes remaining in solution.

After the separation of these precipitates, we can withdraw, by a suitable evaporation, crystals of créatine, discovered by M. Chevreul in boiled meat.

Pushing the concentration further, there is formed in the syrupy liquid acicular crystals, which separated by the filter, and purified by new crystallisations, presents white spangles of a very brilliant pearly lustre, and soluble with difficulty in alcohol. The liquid, separated from its crystals, changes into a thick mass formed of the syrupy mother-liquor and fine crystals, grouped concentrically, very soluble in alcohol, and even in a mixture of alcohol and ether. These two crystalline matters are salts with bases of potash and lime combined with new acids, containing nitrogen.

The latter mother-liquor contains lactate of potash. To extract the free lactic acid, I treat this mother-liquor with alcohol, and I add oxalic acid equally dissolved in alcohol. I thus obtain the separation of the potash in the state of oxalate of potash, I then add ether as long as the liquid is turbid. By these means, I separate divers other matters, and the alcoholic solution retains the lactic acid, susceptible now of giving, with hydrated lime, lactate of lime, which allows the lactic acid and the other lactates to be obtained.

In submitting to analysis the lactate of lime and that of zinc prepared by these various methods, I have obtained for the first the formulæ of $C^6\ H^5\ O^5 + Ca\ O \times 4\ Aq.$; the lactate of zinc has given me $C^6\ H^5\ O^5,\ Zn\ O + 2\ Aq.$

These results will no longer leave the least doubt on the nature of the non-volatile organic acid spread in the animal organism; they explain the rapid reaction of the muscles, and now that we know that in such an extent of the bodies of animals there exists a liquid acid which is only separated from an alkaline fluid (the blood and lymph) by very thin membranes, we may, I believe, explain many electric phenomena observed by M. Matteucci, and other physiologists on the bodies of dead animals.

Having operated on hundreds of pounds of meat, I have obtained a sufficient quantity of créatine to be able to submit this substance to a thorough examination.

Its physical properties have been given with such precision by M. Chevreul, that I can add nothing to the description given by this illustrious chemist. I think I can conclude from my experiments that créatine makes part of the flesh of all animals. So far as I have gone I have shown it to exist in the flesh of beef, veal, mutton, pork, horse, hare and goat. The beautiful discovery of this able observer becomes still more important, since we cannot doubt that créatine plays a great part in the vital actions. It is at least certain that the *bouillée* of meat cannot be replaced either by gelatine, or by any other liquid extracted from another part of the organised animal, unless from the muscles. I have found créatine in the heart of the ox, but not in the brain, the liver, the lungs, or the kidneys.

Créatine belongs by its crystallisation to the clinorhombоïdal system ; it forms tolerably large crystals, clear, transparent, and of great beauty; they lose at 100 degrees, 12.18 for an 100 of water, which corresponds to two atoms.

The results of numerous analyses have given me as the composition of crystallised créatine, the formula $C^8 N^3 H^{11} O^6$.

Créatine is a neutral or indifferent body, which dissolves in alkaline liquids or weak acids, and may be again withdrawn without having undergone any change, but in presence of acids or concentrated caustic alkalies, its properties are changed.

In presence of energetic acids, créatine is transformed into an organic base, possessing very remarkable properties. The matter combined with the acid is no longer créatine, and can no more be transformed into this body ; it is a new body, which I shall designate *creatinine*, and which is formed in the presence of muriatic and sulphuric acids by the displacement only of four atoms of water. Analysis has given me for créatinine the formula $C^8 N_3 H_7 O^2$. Créati-

nine is much more soluble in water and in alcohol than creatine. Its solution in water *has a caustic taste like ammonia.* It changes to blue the red litmus paper; it combines with all the acids and forms salts of great beauty; its salt of platina is remarkable for the largeness of its crystals and their beautiful yellow golden colour. The formula just mentioned expresses the quantity which combines with one equiv. of acid. The crystals of créatinine belongs to the monoclinometric system—they are voluminous, colourless, and very shining.

Créatine contains the elements of glycocolle (sugar of anhydrous gelatine) with one atom more of ammonia; the créatinine, those of caffeine, with one atom more of amide.

I will add, that forty lean fowls have furnished me with about 24 grammes of créatine; 56 pounds of beef 16 grammes; and 100 pounds of horse-flesh 36 grammes.

The extracts of all the meats on which I have operated, evaporated to dryness and calcined to redness, leave a white ash containing only phosphates. The liquids furnished by the flesh of beef and of the horse leave a mixure of phosphate of alkalies (of potash and of soda,) precipitating the salts of silver yellow, and the pyrophosphate of soda and of potash precipitate them white. The flesh of fowl leaves pure pyrophosphates.

The relation of the salts of potash and of soda in the liquids of flesh and in the blood are very different. For 1 equiv. of potash the blood of the ox contains 10 or 12 equivs. of soda; this relation is inverted in the watery extract of the flesh of the same animal. The blood of the horse contains for 1 equiv. of potash 3.62 equivs. of soda; for the same quantity of soda, the flesh of the same horse contains 6.9 equivs. of potash. These relations will conduct to some important conclusions, if we remember that in milk they are the salts of potash which predominate. If a salt of soda (a phosphate of soda) is really and indispensably necessary for the constitution of the blood of many animals, it will

follow that the addition of chloride of soda to the nutriment of these animals is as necessary and indispensable for all places where the forage food does not contain either the phosphate or the other salts of soda, as is the case in many of the localities of Germany.

We may easily conceive that the chloride of soda, by a reciprocal decomposition with the phosphate of potash (which predominates in our wheat grain, &c.) may furnish phosphate of soda and chloride of potash; and this latter salt is never deficient in the liquids of the flesh.

Not to encroach on the time of the Academy, I will end my observations here, in referring for a more lengthy detail to a pamphlet actually in the press. I shall only add that créatine, by a prolonged ebullition with very concentrated barytes water, separates itself into urea (or into carbonate of barytes and into ammonia), into a new organic base, which forms a salt with sulphuric acid, which crystallises in pearly spangles resembling chlorate of potash, and into a new crystallisable acid, which I have not studied through want of a sufficient quantity.

In terminating this paper I will mention some facts observed in my laboratory, and which I deem worthy of attention.

M. Henneberg, one of my pupils, has found that the blood of fowl contains silicate of potash, or of soda, which explains the existence of the enormous quantity of silica remarked in the feathers of birds.

M. Dorter Bensch, my *preparer*, has shown that the milk of the three bitches fed with milk during twelve, fifteen, and twenty-seven days, contains sugar of milk perfectly crystallisable.

To conclude, M. Gugelberger, another of my pupils, has obtained by the distillation of casein or of gelatine with the peroxide of manganese and sulphuric acid, pure aldehyde and essence of bitter almonds, both in sufficiently large quantities to be able to demonstrate this remarkable fact by analytical results.—*Chemist.*

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At a stated meeting of the Philadelphia College of Pharmacy, held Ninth month 28th, 1846,

Daniel B. Smith, President in the Chair,

The following Report presented by Warder Morris, Chairman of the Committee on Finances, was accepted, and the committee discharged, with the thanks of the College for their services.

The committee appointed in 1844 on the finances of the College, have the satisfaction to report that they have at length brought the business intrusted to them to a conclusion. The debt of the College at the time of their appointment was $7,800, which was held chiefly by members of the College. Its inability to pay the interest on this debt would soon have rendered the College bankrupt, and the committee feel proud of the liberality and public spirit with which the members have responded to the appeal made to them. Twenty-six shares amounting to $2600, have been assigned to the College, and donations in money to the amount of $242 have been received in aid of the Institution. In addition to this sum there have been paid over to the committee by a resolution of the College, $100 of the monies in the hands of the committee of publication, $116 proceeds of the sales of directions for patent medicines, and $392 from the sale of Latin labels, and with these sums they have been enabled to purchase twenty shares of the loan. They have also received from the committee on the latter subject, seventy-five books of Latin labels, with which they have purchased two additional shares, making in all forty-eight shares which they have extinguished—thus relieving the College from the annual charge of $288. The committee flatter themselves that this timely aid will not only enable us to meet our engagements, but to form a

sinking fund for the extinguishment of the debt. The unavoidable annual expenses of the College may be thus estimated.

Ground rent to A. Miller,	$225
Interest on $3000 loan at 6 per cent.	180
Taxes,	65
Lighting and warming Hall, &c.	110
Advertising Lectures,	20
Serving notices, &c.	40
Total	$640

The income of the College will probably not vary greatly from the subjoined estimate :

Annual payments of 70 members,	$350
Rent of cellar,	75
Rent of 3d story, (vacant at present)	75
" 4th "	75
Temporary rental of rooms,	70
Diplomas,	30
Matriculating tickets,	15
Tax on Professors,	75
Total	$765

In making these estimates nothing has been allowed for repairs, and it is probable that an amount equal to the rent of the third story room for two years, must be applied within that time to this purpose. As there can be little doubt of our being able to rent the room, the committee think that there is every reason to believe that the income will more than defray the expenses of the College. In estimating the amount of annual payments at $350, the committee have supposed that those members who have relinquished stock to the amount of $100 and upwards, would be exempted from the annual payment. This exemption was stipulated for in several instances, and it seems but just to extend it to all alike. There is due on

account of interest up to the first of this year, the sum of $500, and the Treasurer having $400 in his hands, the committee have authorized him to pay the arrearages. The committee further suggest that the profits on the printing of the Journal, the Labels and Directions, together with all that can be spared from the general income, be appropriated as a sinking fund for the payment of the debt. They further suggest an application to the Legislature to exempt the Hall of the College from taxation, all which is respectfully submitted. Signed,

Warden Morris,	Samuel F. Troth,
Thomas P. James,	Joseph C. Turnpenny,
William Procter, Jr.	Daniel B. Smith,
Charles Ellis,	Dillwyn Parrish,
Ambrose Smith.	

In accordance with a suggestion in the said report, the following named members of the College, having generously relinquished to the College from one to five shares of its loan, each valued at $100 per share, it was resolved that,

Peter Lehman,	Warder Morris,
Charles Ellis,	Alexander Fullerton,
Dr. George B. Wood,	Dillwyn Parrish,
Algernon S. Roberts,	Samuel P. Shoemaker,
John Price Wetherill,	Daniel B. Smith,
Edward Roberts,	Frederick Brown,
Dr. William Wetherill,	Charles Shaeffer,
Edward Needles,	Thomas H. Powers,

be exempted from any further annual contribution to this Institution. Of this resolution the Secretary was directed to inform them. On motion of Warder Morris it was resolved, that a committee on the sinking fund be annually appointed at the time of the election for officers, whose duty it shall be to invest such sums, as may from time to time be placed at their disposal, in the purchase of the debt of the College. Also,

Resolved, That the sum of fifty dollars annually from the

profits of the Publication committee, the profits of the committee on Latin Labels and Patent Medicine Directions, together with the amount received from the Professors, be annually paid over to the committee on the sinking fund. Warder Morris, Samuel F. Troth, and J. C. Turnpenny, were appointed the sinking fund committee until the next annual election.

The proposal submitted at the last stated meeting, to alter Law 5, Section 1st, by striking out "The number of Resident Members shall not exceed one hundred," was considered and adopted. The College then proceeded to the election of eight members of the Board of Trustees, to serve for one year in the place of those whose term expires this evening, and the following gentlemen were duly elected.

Thomas P. James.	H. W. Worthington,
Jacob L. Smith,	Robert Shoemaker,
A. J. L. Duhamel,	William J. Jenks,
James L. Elliott,	Caleb H. Needles.

Then adjourned.

At a stated meeting of the College, held Third month, 29th, 1847,

Daniel B. Smith, President in the Chair,

The minutes of the Board of Trustees were read and adopted. Henry Pemberton, Francis Zerman, and Edward Needles, were recommended by the Trustees as suitable candidates for Resident Membership, and on motion the College proceeded to their election. The Tellers reported they had received the requisite number of votes, and they were accordingly declared members of the Philadelphia College of Pharmacy. The committee appointed to assist the secretary in preparing for publication the Constitution of the College, and a revised list of its members,

Report, That they have prepared from the minutes the amended Constitution, and a revised list of members, which is now ready for publication. By the minute of their appointment, they are authorised to publish the document

and they would suggest the propriety of furnishing each member with a copy. All which is respectfully submitted.

SAMUEL F. TROTH,
WILLIAM PROCTER, JR. } *On behalf of the Com.*

The following resolution, after some interesting discussion, was on motion adopted :

Whereas, a Convention will assemble in the city of Washington in May, 1850, for the purpose of effecting a revision of the United States Pharmacopœia, to which this College of Pharmacy is authorized to send delegates,

Resolved, that a committee of the College be appointed to take into consideration the proposed revision, and report upon such changes and amendments as may appear proper. The report to be submitted to the College at least six months before the sitting of the Convention.

The following members were apppointed to carry out the resolution :

Daniel B. Smith (Chairman,)	Jacob L. Smith,
William Procter, Jr.	Ambrose Smith,
William J. Jenks,	Charles Ellis,
John H. Ecky,	Henry W. Worthington,
Robt. Bridges, M. D.	Edward Parrish,
Thomas P. James,	Joseph C. Turnpenny,
Dillwyn Parrish,	Joseph Carson, M. D.
William Hodgson, Jr.	

The committee on the Publication of the Journal made a report, of which the following is an abstract.

The receipts on behalf of the Journal since last report, including a balance on hand of $280.14, were			$833 03
Cash paid for printing 4 numbers, including materials, &c.	$325 06		
Do. Report of College, &c.	18 17		
Do. Editing Journal for one year,	150 00		
Other expenses including cash advanced to College,	171 69	664 92	
Balance in hands of Publishing Committee,			$168 11

The committee expressed the desire that a more active interest should be taken by members of the College, both in the circulation of the Journal, and in original contributions to its pages.

Considerable interesting discussion ensued, in which the College was reminded that our Journal is the sole organ of Pharmacy in this country, and that it is conducted on a liberal basis, which should ensure the confidence of Pharmaceutists in different sections of the country.

The committee of Publication were encouraged to adopt such measures as in their judgment are best calculated to advance the interests of the periodical.

On motion the College proceeded to the annual election of officers. The following named gentlemen having received the requisite number of votes, were declared duly elected for the coming year.

President.

Daniel B. Smith.

1st *Vice President.*

Charles Ellis.

2d *Vice President.*

Samuel F. Troth.

Treasurer.

Joseph C. Turnpenny.

Secretary.

Dillwyn Parrish.

Corresponding Secretary.

William Hodgson, Jr.

Trustees.

Dr. Joseph Carson,
John H. Ecky,
William Procter, Jr.
Warden Morris,
Edward Parrish,
Dr. John Harris,
William P. Troth,
Daniel L. Miller, Jr.
Benj. R. Smith, for the unexpired time of A. J. Duhamel.

Publishing Committee.

Dr. Robert Bridges, Daniel B. Smith,
William Procter, Jr. Thomas P. James
Charles Ellis.

Committee on Sinking Fund.

Samuel F. Troth, Joseph C. Turnpenny,
Warden Morris.

Then on motion adjourned.

From the Minutes,

DILLWYN PARRISH, Secretary.

DRIMYS WINTERI.